

ANNUAL REPORT
OF THE
Inspector of Elementary
AGRICULTURAL CLASSES

FOR THE YEAR

1917

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(Being Appendix E to the Report of the Minister
of Education for the year 1917)

PRINTED BY ORDER OF
THE LEGISLATIVE ASSEMBLY OF ONTARIO



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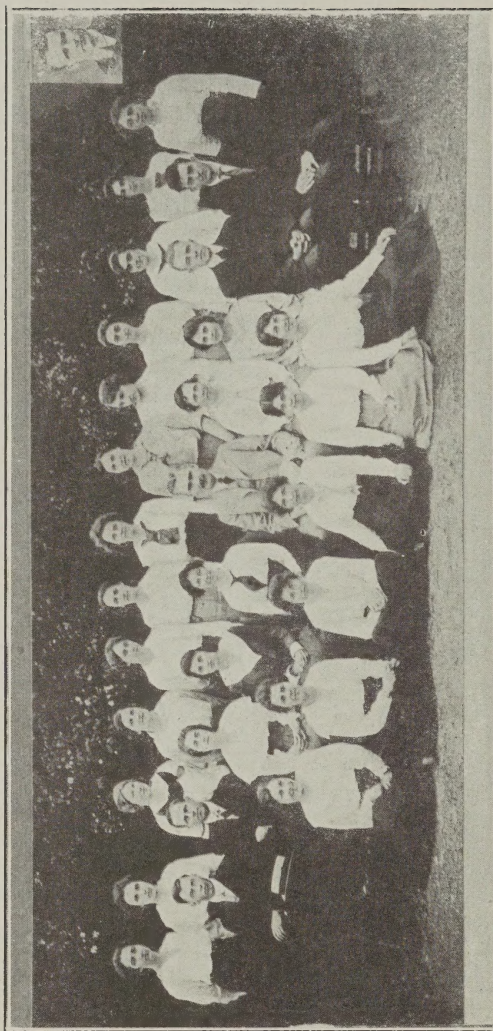
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1918.



Teachers from Dundas Co. in attendance at the Summer Course in Agriculture, O.A.C., 1917—
28 teachers. Inspector Forrester inset.

630.73

On 8

1917

DEC 22 '31 TROXEL

APPENDIX E

REPORT OF THE INSPECTOR OF ELEMENTARY AGRICULTURAL CLASSES

TO THE HONOURABLE R. A. PYNE, M.D., LL.D.,

Minister of Education for Ontario.

SIR,—I beg to submit for your consideration a report on the Elementary Agricultural Classes in connection with the schools of the Province for the year 1917.

I have the honour to be, Sir,

Your obedient servant,

J. B. DANDENO,

Inspector of Elementary Agricultural Classes.

January, 1918.

The duties of the Inspector of Elementary Agricultural Classes include: (1) The inspection of Agricultural classes in Collegiate Institutes, High Schools, Continuation Schools and in Normal Schools; (2) a general supervision of the teaching of Agriculture in the Public and Separate Schools, including the approving of teachers' reports and trustees' statements; (3) attendance upon Teachers' Institutes and taking part in the programmes as frequently as possible; (4) visiting Secondary Schools which have not yet introduced classes in Agriculture to discuss the situation; (5) addressing public meetings, such as township institutes, county trustees' associations, county councils and the like, with the object of explaining the situation with respect to the teaching of Agriculture in the schools; (6) a supervision of the Summer Courses for teachers at the Ontario Agricultural College.

Rural Ungraded Schools

The introduction of agriculture as a regular subject of the Public School curriculum is proceeding quite rapidly throughout the Province of Ontario. Many of

the difficulties which formerly appeared great, are rapidly being overcome. Wherever the subject has been carried on for a year or two, confidence in its usefulness, not only as a subject which is fruitful of practical results, but also as a subject contributing to a considerable extent towards a liberal education, is manifest.

Some of the more important difficulties to be overcome are as follows:

- (1) Teachers, parents, and trustees consider the school programme overcrowded



Home Garden, Rural School, Dundas Co. "Greater Production"



Home Garden, Muriel O'Tobin, Frankland School, Toronto

and are consequently inclined to believe that the introduction of another subject to the programme would be an unwarranted addition to the already heavy burdens of the pupil.

- (2) Some farmers have the idea that they can teach their children at home all the agriculture necessary for them in after life even if those children become farmers. They give emphasis to this argument by saying that lady teachers, many of them brought up in the city and without any of the rural viewpoint, are not qualified to give any agricultural instruction worth while.

(3) One of the most far-reaching difficulties is that the rural population do not really know the nature of the work nor its relation to the schools.

(4) But by far the chief difficulty arises out of the fact that the grants, when earned, are not paid till long overdue. School Boards, teachers and even inspectors are becoming restless and discouraged because of the fact that the grants are so long withheld. The following quotations taken from an extensive correspondence on this point represents the situation and shows how teachers and boards view this particular aspect of the situation:

Since then I have received no grant or further notice, so I presume the money will soon be available.

I think the delay is occasioning some doubt in the mind of the School Board as to whether the expenditure for 1916 was warranted. The possible effect upon further expenditure for this year is not good. It negatives the work we have been trying to stimulate.

HAZEL M. DAVIDSON.

St. Catharines, Ont., May 1st, 1917.

When Boards are promised a refund of money laid out for expenditure, they naturally expect to receive it reasonably on time. Another teacher writes as follows:

If these grants are not forthcoming as the Inspector says they should be, we do not intend teaching agriculture any more.

LILLIAN B. PRIDDLE.

London, May 5th, 1917.

The grants referred to were due in January, and from these letters it appears were not paid on the dates mentioned. The grants to Inspectors were due in the preceding September and were not paid until the following May.

That the movement is making steady progress, however, and that it is being appreciated by Boards of Trustees may be inferred from the following statements, taken from comments made upon the annual reports submitted to the Department of Education. These comments are made voluntarily and are selected from eighty or a hundred reports received in January, 1917:

S.S. No. 3, Fullarton, Perth Co.

We obtained a plot of ground from the Township Council this fall for a term of five years and have prepared it for a school garden. We have had it manured and plowed, bought fencing and implements for garden work and intend buying the remainder of the necessary implements in the spring. We have already spent \$30.00 on our garden this fall.

J. M. CAMPBELL, *Secretary*,

R.R. No. 1, Munro, Ont.

S.S. No. 22, Mountain, Dundas Co.

We expect to have our garden much better this coming year than it has been in the past, as we have employed a caretaker to look after grounds and buildings for the year, also to look after the garden during the holidays and keep everything in good shape.

S. W. VANALLEN, *Secretary*,

Mountain, Ont.

S.S. No. 10, Ellice, Perth Co.

The Agricultural course was not discussed at the annual meeting in 1915, so the teacher and pupils took the course up themselves. We had the ground ploughed in the spring of 1916 and the work was carried out very nicely. During summer holidays the garden was taken care of by teacher and pupils and was a credit to the section, considering the disagreeable season. The matter was discussed at the 1916 meeting and the ratepayers instructed the school board to go ahead and take up the course.

GEO. DAVIDSON, *Secretary*,

R.R. No. 2, Gadshill, Ont.

S.S. No. 8, Grey, Huron Co.

The work has been very interesting, both to the pupils and parents, and it has tended to foster the community spirit and to keep the children interested in the school. I do not think that there was a day during the summer holidays that there was not one of the pupils at the school-gardens, and lots of days four or five. I have been told by some of the parents that if the children learned nothing else than to know weeds and weed seeds that the teaching of Agriculture had a beneficial effect.

We are so well satisfied with the teaching of Agriculture that we intend to continue it during 1917.

ED. FULTON, *Secretary*,
R.R. No. 2, Brussels, Ont.

S.S. No. 5, McGillivray, Middlesex Co.

We consider the school garden a decided success. The pupils take more interest in the crops and animals and trees since Agriculture has been taught.

JOHN DIXON, *Secretary*,
R.R. No. 2, Ailsa Craig, Ont.

S.S. No. 2, E. Flamboro, Wentworth Co.

The Trustees take a great interest in beautifying the school grounds and do all in their power to the furtherance of that purpose. The children have home gardens, and each one has a flower garden at school. The home gardens were very successful. I went and inspected them. The children take a great interest in their gardens and the scheme seems to suit our section to perfection. School days become less monotonous and the children seem brighter and more alert, because they are learning a study that is practical and as this is their ideal, the work appeals to them.

J. A. SMILEY, *Secretary*,
Aldershot, Ont.

From the above quotations it may be seen that the work is becoming understood and appreciated wherever it has had a fair trial. Progress has been much more rapid in some counties than in others. The following list shows the schools conducting classes in agriculture for the whole or a part of the calendar year 1917.

Schools with Classes in Agriculture, Calendar Year 1917

ALGOMA—L. A. Green	3 Kincardine	16 E. Garafraxa
3 Korah	8 "	4 E. "
1 MacDonald	1 Saugeen	1 Mulmur
2 "	CARLETON—Thomas Jamie-son	6 Melancthon
1 Plummer	3 N. Gower & 19 Osgoode	DUNDAS—J. W. Forrester
1 Rose & Plummer	3 Gloucester	Chesterville
1 Korah	5 Gloucester	1 Matilda
1 St. Joseph	6 Fitzroy	2 "
2 Tarentorus	1 Torbolton	7 "
3 "		8 "
4 MacDonald	CARLETON—Willis C. Froats	10 "
4 Thessalon	3 Huntley	14 "
BRANT—T. W. Standing	2 Goulburn & 14 Marlborough	17 "
14 Brantford	6 Goulburn	18 "
23 Brantford	6 Marlborough	1 Mountain
15 Burford	2 Huntley	4 "
21 & 5 Burford & Oakland	10 Goulburn	6 "
BRUCE—John McCool		7 "
2 Brant	DURHAM—A. Odell	9 "
2 Carrick	7 Hope	10 "
3 "	3 Cavan	11 "
4 "	10 Hamilton	12 "
6 "	DURHAM—W. E. Tilley	14 "
13 "	7 Manvers	15 "
Tara P.S.	" Newcastle P.S.	16 "
BRUCE—W. J. Lee	10 Manvers	18 "
10 Carrick	4 Clarke	22 "
1 "	DUFFERIN—W. R. Liddy	22 & 23 Winchester & Mountain
BRUCE—W. F. Bald	3 Amaranth	1 Williamsburg
15 Bruce	12 Mono	10 "
2 Huron	10 Melancthon	14 "
13 "	11 E. Luther	17 & 24 "

Schools with Classes in Agriculture, Calendar Year 1917—Continued

DUNDAS— <i>Continued.</i>	13	Edwardsburg	12 & 14	ThurLOW
18 & 1	14	"	23	Sidney
Winchester P.S.	5	& 19 Augusta & Ed-	HURON— <i>J. E. Tom</i>	
2 Winchester		wardsburg	5	Osborne
4 "	10	Augusta	8	Ashfield & W. Wa-
5 "	11	"		wanosh
6 "	17	"	17	W. Wawanosh
8 "	3	Oxford	6	Stanley
9 "	8	"	14	"
12 "	GLENGARRY— <i>J. W. Crewson</i>		4	Goderich
14 "	1	Charlottenburgh		Exeter P.S.
15 "	2	"	8	Hay
18 "	10	"	HURON— <i>J. M. Field</i>	
20 "	8 & 20	"	8	Grey
21 "	5	Kenyon & Lochiel	4	Morris & Turnberry
	9	Kenyon	HURON— <i>J. F. Sullivan</i>	
ELGIN— <i>J. C. Smith</i>	16	"	2	Ashfield
11 Bayham	5	Lancaster	KENT— <i>J. F. Sullivan</i>	
18 "	6	"	5	Raleigh
9 Malahide	8 & 9	"	KENT— <i>J. H. Smith</i>	
U 11 " & 16 Yarmouth	16	"	2	Chatham
14 "	17	"	5	"
1 Southwold	25	"	6	N. "
3 "	5	Lochiel	7	"
6 "	9	"	8	"
7 "	11	"	9	"
8 "	14	"	11	"
11 "	15	"	2	Dover
12 "		Maxville P.S.	6	"
14 "			11	"
6 Yarmouth	GREY— <i>H. H. Burgess</i>		12	"
7 "	1	Derby	14	"
18 W. "	2	"	5	Raleigh
24 "	16	Sydenham	U 6 " & Dover	
27 "	5	Sullivan	12	"
			13	"
ELGIN— <i>J. A. Taylor</i>	HALTON— <i>J. M. Denyes</i>		6	Romney
1 Aldborough & Dun-	12	Beverly	1	Tilbury E. & Raleigh
wich	14	Beverly	2	Tilbury
2 Alborough	2	Esquesing	U 2 "	
7 "	3	"	4	Dover
10 "	13	"	14	Chatham
12 "	U.A.E. "		19	"
14 "	6	Nassagaweya	KENT— <i>W. H. G. Colles</i>	
15 "	3	Nelson	U. 3 Camden	
3 Dunwich	8	"	4	"
4 "	9	"	5	"
9 "	11	"	8	"
11 "	12	"	12	"
Rodney P.S.	2	Trafalgar	2	A. Chatham
ESSEX— <i>D. A. Maxwell</i>	3	"	4	"
1 Mersea	6	"	18	"
4 Malden	8	"	1	Harwich
2 N. Colchester	7	"	2	"
3 Gosfield	18	"	4	"
15 Gosfield	HASTINGS— <i>J. E. Minns</i>		5	"
ESSEX— <i>J. F. Sullivan</i>	3	Rawdon	6	"
2 Maidstone	13	"	7	"
7 Sandwich S.	12	Huntington	9	"
FRONTENAC— <i>J. P. Finn</i>	13	Hungerford	13	"
4 Wolfe Island	HASTINGS— <i>H. J. Clarke</i>		17	"
GRENVILLE— <i>T. A. Craig</i>	2	Sidney	1	Howard
7 Augusta	5	"	2	"
1 S. Gower	20	"	3	"
3 "	22	"	8	"
1 Edwardsburg	3	ThurLOW		
10 "	6	"		

Schools with Classes in Agriculture, Calendar Year 1917—Continued

KENT—Continued.

10 Howard
12 "
14 "
16 "
2 Orford
9 "
11 "
12 "
U3 Raleigh & Harwich
U4 "
5 Raleigh
10 "
1 Zone
2 "
3 "
4 "
5 "

LANARK—W. C. Froats

3 Beckwith
4 "
5 "
6 "
7 "
8 "
10 "
Carleton Place P.S.
1 Montague
2 "
3 "
4 "
9 "
15 "
1 Pakenham
2 "
3 & 11 "
6 "
1 Ramsay
4 "
6 & 7 "
8 "
11 "
14 "

LANARK—F. L. Michell

3 Bathurst
4 "
5 "
9 "
10 "
6 & 6 " & Drummond
7 Burgess & Bathurst
11 Drummond
12 "
15 "
17 "
18 "
6 Lanark
8 " & Drummond
12 "

LAMBTON—Henry Conn

8 Bosanquet
1 Euphemia
9 Moore
4 Plympton
7 "
1 Sarnia
Wyoming P.S.

LAMBTON—N. McDougall

20 Enniskillen
23 "

LINCOLN—G. A. Carefoot

6 Caistor
1 Clinton & 2 Louth
2 " & 3 "
3 " & 4 "
1 Louth
8 " & 2 Grantham
3 Grantham
6 "
3 Gainsboro
4 "

LENNOX & ADDINGTON—M.

R. Reid
Sheffield, Consolidated

LEEDS—J. F. McGuire

4 Bastard
7 "
11 " & Burgess
15 " "
2 Crosby
5 S. "
16 S. "
3 Leeds & Lans. Rr.
4 " " "
4 " " Ft.
6 " " Rr.
7 " " "
8 " " "
10 " " "
13 " " Ft.
16 " " "
17 " " "

MIDDLESEX—J. F. Sullivan

3 Biddulph
6 "
10 E. & W. Williams

MIDDLESEX—C. B. Edwards

Tecumseh (City of London)

MIDDLESEX—H. D. Johnson

6 Adelaide
9 "
4 Caradoc
2 "
12 "
15 "

11 Ekfrid
3 Lobo
7 "
2 Metcalfe
6 "

Newbury P.S.
3 E. Williams
6 "

MIDDLESEX—P. J. Thompson

6 Biddulph
1 Delaware
2 "
3 "
4 "
5 "
6 "

2 Dorchester

4 "
5, 18, & 21 Dorchester & Westminster
8 Dorchester
15 "
1 London
1 & 1 " & Dorchester
5 London
7 "
8 "
14 "
15 "
16 "
19 "
23 "
17 "

Lucan P.S.

4 McGillivray
5 "
8 "
11 "
12 "
13 "
14 "
15 "
18 "
1 W. Missouri
2 "
3 "
6 "
7 "
8 "
11 "
13 "

1 Westminster

3 "
4 "
5 "
6 & 10 " & Dorchester
7 Westminster

10 "
11 "
14 "
15 "
17 "
18 "
19 & 9 " & Dorchester

MANITOULIN ISLAND—J. W. Hagan

3 Howland

NORFOLK—H. F. Cook

4 Middleton
10 Houghton
8 & 15 Houghton & Bayham
11 Charlotteville

NORTHUMBERLAND—A. Boyes

11 Seymour

NORTHUMBERLAND — J. P. Finn

12 Percy & Seymour

ONTARIO—T. R. Ferguson

1 Scott

Schools with Classes in Agriculture, Calendar Year 1917—Continued

ONTARIO— <i>R. A. Hutchison</i>	3 Fullarton	WATERLOO— <i>W. J. Lee</i>
4 E. Pickering	4 " & Downie	13 Waterloo
8 Pickering	5 "	
11 "	6 "	WELLINGTON— <i>R. Galbraith</i>
4 Whitby	1 Hibbert	6 W. Luther
OXFORD— <i>J. M. Cole</i>	2 "	1 Maryborough
7 Blenheim	4 "	2 Minto
13 "	5 "	4 Peel
18 "	City of Stratford	
2 & 22 Burford & Blenheim	PETERBOROUGH— <i>W. J. Lee</i>	WELLINGTON— <i>J. J. Craig</i>
11 E. Nissouri	8 Otonabee	2 Guelph
2 E. Zorra	PETERBOROUGH— <i>Richard Lees</i>	3 "
6 "	3 Dummer	6½ & 7 Guelph (consol.)
15 "	13 Otonabee	WELLINGTON— <i>W. J. Lee</i>
OXFORD— <i>R. A. Patterson</i>	16 "	1 Nichol
1 & 2 Oxford	PETERBOROUGH— <i>G. E. Broderick</i>	12 Peel
7 "	2 Smith	WELLAND— <i>J. W. Marshall</i>
PEEL— <i>W. J. Galbraith</i>	5 "	6 Crowland
10 Chinguacousy	7 Verulam	6 Stamford
22 "	9 "	U 1 Thorold & Stamford
24 "		WENTWORTH— <i>J. H. Smith</i>
14 Caledon	RENFREW— <i>G. G. McNab</i>	2 Ancaster
PRINCE EDWARD— <i>J. E. Benson</i>	10 Grattan	3 " Barton & Glanforth
4 Hallowell	9 Horton & Admaston	3 Barton
5 N. Marysburg	8 McNab	6 "
PRESCOTT— <i>J. Nelson</i>	4 Radcliffe	7 "
1 N. Plantagenet	RENFREW— <i>I. D. Breuls</i>	3 Beverly
PERTH— <i>J. F. Sullivan</i>	6 Alice	7 "
4 Hibbert	7 Bromley	8 "
PERTH— <i>William Irwin</i>	6 Ross	2 E. Flamboro
1 Alma	8 "	6 W. "
1 N. Easthope	3 Wilberforce	1 Saltfleet
2 "	RENFREW— <i>J. P. Finn</i>	9 "
3 "	Eganville	YORK— <i>A. A. Jordan</i>
4 "	RUSSELL— <i>J. Nelson</i>	Markham P.S.
5 "	5 Cumberland	4 Markham
6 "	SIMCOE— <i>Isaac Day</i>	6 "
7 "	8 Medonte	8 "
8 "	5 N. Orillia	14 "
4 Ellice	8 Orillia	19 "
10 "	6 Oro	20 "
6 Logan	9 "	1 Scarboro
11 "	11 "	7 "
1 Mornington	17 "	14 "
3 "	19 "	3 York
4 "	SIMCOE— <i>J. L. Garvin</i>	4 "
20 "	7 Flos.	5 "
PERTH— <i>J. H. Smith</i>	SUDBURY— <i>W. J. Summerby</i>	7 "
7 Blanshard	2 Neelon	9 "
9 "	TIMISKAMING— <i>J. A. Banister</i>	14 "
10 "	1 Armstrong	26 "
14 " & Fullarton	1 Clergue	27 "
3 Downie	WATERLOO— <i>L. Norman</i>	30 "
4 "	4 Waterloo	YORK— <i>A. L. Campbell</i>
5 "	19 "	5 Etobicoke
6 "	WATERLOO— <i>F. W. Sheppard</i>	10 "
7 "	6 Waterloo	13 "
8 "	4 Wellesley	14 "
9 "	7 "	19 York
10 "	8 "	22 S. York
4 S. Easthope	11 " & Woolwich	28 York
8 "	13 "	31 "
10 "		YORK— <i>C. W. Mulloy</i>
2 Fullarton		5 E. Gwillimbury
2 A.C.		



Teachers in attendance at the School Fair, Winchester Township, Dundas Co., Sept. 1917. The bread made by a pupil and exhibited at this fair won second prize at the Provincial Fair, 1917.



Children's parade, School Fair, Dundas Co. Total attendance, 1,500 : children, 280. Sept., 1917

The Public and Separate Schools qualifying for grants commencing in 1903 are given in the following table:

Year	No. of Schools	Year	No. of Schools	With School Gardens	With Home Gardens
1903	4	1911.....	33	.....	.....
1904	7	1912.....	101	.....	.....
1905	6	1913.....	159	.....	.....
1906	8	1914.....	264	208	56
1907	2	1915.....	407	222	185
1908	14	1916.....	585	324	261
1909	16	1917.....	950	550	400
1910	17				

Until 1914, no distinctions were made in the reports respecting Home Gardens and School Gardens.

*Estimated. All the reports have not yet been received.

Of these 407 schools teaching Agriculture in 1915, 100 were taught by teachers who held certificates in Agriculture and 307 were taught by teachers with Second Class certificates.

Of the 585 schools teaching Agriculture in 1916, 201 were taught by teachers who held certificates in Agriculture and 384 were taught by teachers with Second Class certificates.

The amount paid out during the calendar year 1916 was:

To Public and Separate School Boards	\$4,965.51
To Teachers	11,589.02
To Inspectors (school year 1915-16)	1,778.00
	<hr/>
	\$18,332.53

This amount was paid from the Legislative grants entirely. The Federal appropriation was withheld by the auditor.

The funds set apart to be used to encourage the teaching of Agriculture in Ontario is administered as set forth in the following clause of the agreement between the Federal Government and the Province:

"To provide for and to encourage the teaching of Agriculture, Manual Training, as applied to work on the farm, and Domestic Science in High, Public, Separate and Continuation Schools and in Universities, to be available for grants, Services, Expenses and Equipment, and travelling expenses of teachers, inspectors and others in attendance at Short Courses or other educational gatherings, and to be paid out on the recommendation of the Department of Education, \$30,000."

The sums apportioned to Teachers and Boards with the conditions under which they are payable, are shown in the following schedule as respects rural and ungraded schools [Circular 13, Regulations 7, (1), (2), (3), (4)]:

I. Schedule of Grants for Rural Ungraded Schools—Forms III and IV

Requirements	Where the teacher holds a second class certificate but is not certified in Agriculture.				Where the teacher holds an Elementary certificate in Agriculture and Horticulture, or receives a certificate during the year.			
	To the Board*	To Teacher*			To Trustees	To Teacher*		
		For full year	For fall term	For winter and spring terms		For full year	For fall term	For winter and spring terms
A. FIRST PLAN								
<i>Instruction.</i>	Not exceeding \$10.00	\$15.00	\$5.25	\$7.50	Not exceeding \$20.00	\$40.00	\$14.00	\$21.00
Instruction throughout the whole year, to be completed satisfactorily, with requirements regarding pupils' records, teacher's report, trustees' statement, etc., fulfilled.								
<i>Home Gardens.</i>								
Home gardens or projects by pupils of Forms III and IV supervised by the teacher.								
<i>School Grounds.</i>								
Well kept grass and flower plots, borders, screens, etc., at school for beautifying grounds and for instructional purposes.								
B. SECOND PLAN								
<i>Instruction.</i>	Not exceeding \$15.00	\$20.00	\$8.00	\$10.00	Not exceeding \$30.00	\$50.00	\$18.00	\$27.00
Instruction throughout the whole year to be completed satisfactorily, with requirements regarding pupils' records, teacher's report, trustees' statement, etc., fulfilled.								
<i>School Gardens.</i>								
(1) A pupils' school farm or school garden at or near the school, having at least six square rods for experimental and observation plots and contributing to the School Fair.								
(2) For other pupils of Forms III and IV not represented in the work on the six square rods, either additional plots in the school garden, or gardens or projects at home, supervised by the teacher.								
<i>School Grounds.</i>								
Well kept grass and flower plots, borders, screens, etc., for beautifying grounds and for instructional purposes.								

* When, with the approval of the local and the Departmental Inspector, the work begins at Easter, a proportionate amount of the grants will be paid, provided an undertaking is given by the Board that it will be continued during the year following.

On the recommendation of the local inspector, approved by the Departmental Inspector, the grants to Boards and teachers in the districts and the poorer parts of the counties may, in each case, be one-half greater than those provided in the above schedule.

When the teacher holds an Intermediate certificate in Agriculture, the grant in addition to his salary shall be one-half more than that specified in the above schedule for an Elementary certificate. (This clause was accidentally omitted from Circular 13, 1917.)

The Regulations have recently been amended so as to include schools in cities and towns where such schools comply with the regulations. It is not expected that Agriculture will be introduced into the schools of the larger cities to any very great extent, at least for some time yet. However, the Department of Education has introduced a schedule of grants applicable to all graded schools which is set forth as follows:

II. Schedule of Grants for Rural and Urban Graded Schools

Forms III and IV

Requirements	Where the teacher is certificated in Agriculture, or receives a certificate during the year.			
	To the Board.*	To the Teacher.*		
		For full year.	For fall term.	* For winter and spring term.*
A. FIRST PLAN				
<i>Instruction.</i>				
Instruction throughout the whole year, to be completed satisfactorily, with requirements regarding pupils' records, teacher's report, trustees' statement, etc., fulfilled.	\$20.00 for each teacher not exceeding \$100.00 for each School.	\$40 00	\$14 00	\$21 00
<i>Home Gardens.</i>				
Home gardens or plots supervised by the teacher.				
B. SECOND PLAN				
<i>Instruction.</i>				
Instruction throughout the whole year, to be completed satisfactorily, with requirements regarding pupils' records, teacher's report, trustees' statement, etc., fulfilled.	\$20.00 for each teacher not exceeding \$150.00 for each School.	\$50 00	\$18 00	\$27 00
<i>School Gardens.</i>				
A pupils' school garden at or in connection with the school, having at least six square rods for experimental and observation plots for each class.				

* When, with the approval of the local and the Departmental Inspector, the work begins at Easter, a proportionate amount of the grants will be paid, provided an undertaking is given by the Board that it will be continued the year following.

Form V

When a Board maintains the course prescribed for the Fifth Form, the Minister will pay, on the same conditions, the same grants as are payable for Lower School courses in agriculture and horticulture in the High and Continuation Schools. For particulars, see the Regulations of these Schools.

When also, as authorized below, pupils in Form V continue the course for Form IV with additions selected by the Principal from the course for Form V with the approval of the Inspector, the Minister may pay the teacher in addition to the grant for Form IV a grant for such work, not exceeding the fourth of the grant payable to him for Form IV, on the report and recommendation of the local Inspector approved by the Departmental Inspector of Elementary Agriculture and Horticulture.

(2) Where in a graded school there are two or more teachers with certificates in Agriculture, conducting classes in Forms III and IV in accordance with the regulations, the grants shall be apportioned to the teacher as follows: For each of two teachers 7-eighths of that specified above for one teacher; for each of three teachers 6-eighths; for each of four teachers 5-eighths, and so on.

(3) If one qualified teacher teaches the subject in different grades in the same school, or in different schools, the grant to him shall be apportioned on the same bases as for more than one teacher in (2) above.

(4) When two or more rural schools unite to form a consolidated school the grant to the Board shall be the total amount that might have been received by the individual schools before consolidation; and the grants to the teacher or teachers, as the case may be, shall be those set forth in the schedule for graded schools.

School Fairs

School Fairs are organizations, under the charge of the District Representatives of the Department of Agriculture, of the county in co-operation with Inspectors, Trustees and Teachers. Where there is no District Representative in the county the burden of management will fall upon the Inspector and the teachers. The only counties without a representative at the present time are: Huron, Perth and Russell.



School Garden, S. S. No. 2. Glanford, Wentworth Co. Teacher, Mr. E. C. Bouck

For the information of the teachers the following list, correct to September 12th, 1917, is submitted:

District Representatives of the Ontario Department of Agriculture

<i>County.</i>	<i>Representatives.</i>	<i>Address.</i>
Algoma	J. N. Wadsworth	Sault Ste. Marie
Brant	R. Schuyler	Paris
Bruce	N. C. MacKay	Walkerton
Carleton	W. D. Jackson	Carp
Dufferin	H. A. Dorrance	Orangeville
Dundas	E. P. Bradt	Morrisburg
Durham	G. A. Williams	Port Hope
Elgin	C. W. Buchanan	Dutton
Essex	J. W. Noble	Essex
Frontenac	A. W. Sirett	Kingston
Glengarry	D. E. MacRae	Alexandria
Grenville	J. E. McPostie	Kemptville
Grey	H. C. Duff	Markdale
Haldimand	G. L. Woltz	Cayuga
Halton	W. F. Strong	Burlington
Hastings	A. D. McIntosh	Stirling
Kenora	E. E. Reilley	Kenora

District Representatives of The Ontario Department of Agriculture.—Continued

<i>County.</i>	<i>Representatives.</i>	<i>Address.</i>
Kent	J. I. Dougherty	Chatham
Lambton	W. P. Macdonald	Petrollea
Lanark	F. Forsyth	Perth
Leeds	W. H. Smith	Athens
Lennox and Addington	G. B. Curran	Napanee
Lincoln	D. Elliot	Box 107, St. Catharines
Manitoulin	I. F. Metcalf	Gore Bay
Middlesex	R. A. Finn	Box 663, London
Muskoka and Parry Sound	F. C. Paterson	Huntsville
Norfolk	E. F. Neff	Simcoe
Northumberland	H. Sirett	Brighton
Ontario	R. M. Tipper	Whitby
Oxford	G. R. Green	Woodstock
Peel	J. W. Stark	Brampton
Peterborough	F. C. McRae	Norwood
Prince Edward	A. P. MacVannel	Picton
Rainy River	R. E. Gunning	Emo
Renfrew	M. H. Winter	Renfrew
Simcoe	F. A. Wiggins	Collingwood
Thunder Bay:		
Port Arthur Section	L. M. Davis	Port Arthur
Fort William Section	G. W. Collins	Fort William
Timiskaming	C. Graham	New Liskeard
Victoria	A. A. Knight	Lindsay
Waterloo	J. S. Knapp	Galt
Welland	E. K. Hampson	Welland
Wellington	R. H. Clemens	Arthur
Wentworth	J. N. Allan	7 Market St., Hamilton
York	J. C. Steckley	Newmarket

Respecting the origin and progress of School Fairs I quote from a statement by Mr. R. S. Duncan, Supervisor of District Representatives:

"The Rural School Fair idea originated in Waterloo County in the year 1909, when the District Representative distributed seeds for a small home garden plot to the pupils of three schools in North Dumfries Township. That fall the first School Fair in Ontario, if not in the Dominion, was held at the River Road school near Galt, and augured well for the success and spread of the movement through the rural districts. This was a 'Red Letter Day' long to be remembered by the writer, who was present and assisted in the management of the Fair.

"The first Fair was a success from every standpoint—the interest of the pupils was aroused and their thought was stimulated; the teachers were heartily in favour of the development of the scheme; the trustees gave their undivided support and the parents voiced their sentiments in favour of the idea in no uncertain tones, and became enthusiastic concerning the new atmosphere which had been created in the district.

"The movement has grown year by year until in 1917 there were no less than 302 School Fairs held in the Province. One can gather some idea of the movement from the following:

SEED DISTRIBUTED IN 1917

Barley	64 bushels	Mangels.....	5,850 packages
Oats	138 "	Beets	6,430 "
Wheat	23 "	Carrots	6,865 "
Sweet corn	26 " (shelled)	Parsnips	2,840 "
Field corn.....	43½ " (on the cob)	Asters	9,110 "
Peas	580 lbs.	Sweet Peas	4,180 "
Potatoes.....	1,211 bushels	Phlox	1,395 "
Turnips	3,695 packages	Eggs	9,284 dozen



Home Garden. Tom Brick, age 10 (father at the front), Frankland School, Toronto, June, 1917



Same garden, September, 1917

“The following table gives a summarized list of the number of fairs held:”

	1915	1916	1917
No. of Fairs held.....	234	275	302
No. of Schools included	2,291	2,620	2,825
No. of Children taking part.....	48,386	60,262	68,862
Attendance, children	72,860	83,029	86,121
“ adults.....	84,406	95,217	82,077
“ Total.....	157,266	178,246	168,198
No. of Entries.....	116,236	113,263	106,570
No. of Home Plots.....	51,243	55,947	59,329

Quoting further from Mr. Duncan:

"In view of the unprecedented conditions which prevailed in regard to the labour problem, it was decided to discontinue an inspection of the School Fair plots, with the exception of those in newly organized Rural School Fair Districts. A special appeal was made to the teacher and trustees to arrange for some local assistance in the inspection and judging of the plots in their school section. In many instances, the clergy visited the plots, in some cases either the teachers or trustees made the rounds and forwarded plans to the District Representative's office, who awarded prizes for the best cared for plots in the section.

"Practically every organization connected with the rural communities stood behind the School Fair and rendered valuable assistance, not only financially, but in the conduction of the various special features. Let me give a few concrete examples. The Board of Agriculture donated silver cups or shields to the boy or girl securing the highest number of points at the School Fairs in the County, or to the schools whose teams won the Live Stock Judging Competitions; the Women's Institutes assisted in the conduction of refreshment booths in aid of the Red Cross, and undertook in some cases to supply judges for the girls' work in baking and sewing; the Junior Farmers' Improvement Associations had complete charge of some of the Live Stock Competitions conducted at the Fair; the Trustee Boards and the Township Councils were very generous in their assistance from a financial standpoint, in making grants to enable the Rural School Fair Associations to pay their prizes.

"Special mention, of course, should be made of the Rural School Fair Association itself, which is composed of representatives from each school in the District, who were elected by ballot by their own school. The accredited delegates from each school would meet, form a Rural School Fair Association, and elect officers. The School Fair officers would meet perhaps twice during the season to discuss matters pertaining to the welfare of the Fair. Special duties were assigned each officer and director, and their assistance was of untold value. The splendid business training these boys and girls would receive would no doubt stand them in good stead in future years.

"The special features worthy of more than a passing note are the Live Stock Judging Competitions, for teams of three boys from each school, who are asked to judge two classes of Live Stock, generally beef or dairy cattle and heavy horses; the public speaking contests, in which from two to ten boys and girls compete; the boys and girls driving contests, which includes hitching and unhitching; the School Fair Parades; Physical Drill under the Strathcona Trust; Weed and Apple Naming contests, and the exhibition of calves and colts led by the boys who spent considerable time training their pet animals."

School Gardens

A circular—Agricultural Circular, No. 2—was issued in March last giving instruction with respect to school gardens, more particularly to those introduced for the first time. Since most of such gardens were broken up from sod—and many of them stiff, weedy sod at that—a practical method of management of such sod was given in the circular referred to. Many reports have been received indicating very satisfactory results, not only in country schools, but also in schools of towns and cities. The following quotation, taken from a report concerning one of the Public Schools of Picton, shows something of the results to be derived from school gardens.



School Garden, Winchester P. S., Junior III boys laying out their garden



Winchester P. S. Girls at work in the garden, June, 1917



Winchester P. S. Greater Production. A school laboratory

"You will be pleased to know our school garden was a great success. We raised:

Potatoes	9 bushels	Onions	6 pecks
Turnips	12 "	Tomatoes	6 "
White beans	8 "	Radishes	6 "
Carrots	9 "		

and in addition some parsnips, pumpkins, corn and cucumbers.

"We held a School Fair in our building, at which the pupils showed the products of their home gardens as well as the products of the school garden. The fair was well attended and the parents much interested. We felt much encouraged.

ELIZABETH DUNKLEY."

An estimate of the school garden produce of the Public and Separate Schools may be made from the following detailed statement reported from the School of The Immaculate Conception (Separate School), Peterborough.

Expenses	—	Receipts	—
	\$ c.		\$ c.
Cabbage seed.....	0 05	Cabbage	3 60
Sweet Peas	05	Potatoes (two bags)	3 00
Beans	10	Onions (5 pecks)	2 00
Potatoes, one peck	85	Tomatoes (3 pecks).....	75
Carrots	05	Beans (6 pecks).....	3 60
Cucumbers.....	05	Beets	2 00
Lettuce.....	05	Lettuce	50
Radishes	05	Radishes	45
Onions.....	05	Cucumbers	50
Nasturtiums	05	Carrots	60
One doz. eggs.....	45		
Total outlay	\$1 80	Total income.....	\$17 00
Net profit		\$15 20	

In the rural schools in most of the counties very considerable progress has been made, and the idea is quite general that the move is in the right direction and that the school garden will become a permanent part of Public School accommodation. In some cases, the neighbouring farmer deeded a plot of land over to the Board, in other cases, land was secured rent free; in all cases the farmers have shown the disposition, as soon as they are shown the value of the movement to the community, to provide what may be needed.

Dundas County certainly has made immense strides in the direction of agricultural education, and the following statement, taken from the report of the Inspector, shows what may be done:

During the year 1917 there were 36 school gardens in Dundas County. The increase of food production was the chief idea in the making of these gardens in the spring of 1917. The larger part of every garden was devoted to the growing of beans or potatoes. The garden in connection with the Morrisburg Public School produced 71½ bushels of beautiful beans. The smallest yield reported from any school was 40 lbs. of beans. The harvesting, threshing and hand-picking of these beans, in the different schools, were done by the pupils as part of their regular class work in Agriculture. In

several schools the beans planted last spring were weighed, and the increased production noted this autumn. The pupils were particularly interested in this phase of the work, and used the school scales to weigh the produce of their gardens.

One garden was devoted entirely to the growing of potatoes. Each pupil was given a row to plant and care for during the season. The potatoes planted were weighed and likewise the yield this autumn. This stimulated a healthy rivalry among the pupils, and the interest was maintained until the potatoes were dug and weighed in October.

Agriculture is now taught in every school in Dundas County, and in some of the graded schools, as many as three teachers are doing this work. I have yet to find a school in which the teaching of Agriculture has, in any way, interfered with the teaching and progress of other subjects; while several teachers have told me that subjects such as Arithmetic, Literature, Nature Study and Composition, have been directly helped.

J. W. FORRESTER.

COURSE OF STUDY, FORMS III, IV AND V

The Course of Study is so arranged that topics suitable to the different seasons are provided with sufficient elasticity to suit the different localities of the province. The choice of topics within reasonable limits is largely under the



Arbor Day, School Improvement, S. S. No. 17, Williamsburg, Dundas Co.

control of the teacher and the Inspector. The work here below outlined is also set forth in blank forms provided by the Department, and are sent along with the school registers to the teachers through the local Inspectors.

Teachers are required to record regularly in these blank forms the topics and sub-topics upon which instruction is based. This report, when completed, is to be sent to the Public or Separate School Inspector, to be endorsed by him, and then forwarded to the Department of Education at the close of the school year in June.

The work is outlined with a view towards practical work performed as far as possible by the pupils themselves according to instructions given in the Manual. The minimum amount of time is one hour per week for each of Forms III and IV. Where both classes are taken together, as may be the case in schools having a small number in attendance, the work prescribed for Form III should be taken one year and that for Form IV the following year, thus alternating the work in such a way that all pupils completing both Form III and IV will

have covered the whole course. Though it may be wise to carry on some of the work after school hours, it is required that at least one hour per week shall be set apart for this subject on the time-table.

FORM III

AGRICULTURE AND HORTICULTURE.—*The Farm*.—Maps of home farms, with cropping plans for rotation of crops.

Breeds of farm animals.

Germination tests of farm seeds.

Simple classification of soils.

Seasonal studies of farm employments.

Problems in arithmetic relating to the farm.

The Garden.—Growing bulbs for winter and spring bloom.

Growing common vegetables and flowers.

Experiments and demonstrations with vegetables in the school garden.

Hot bed and cold frame.

Poisonous forms of mushrooms.

The Orchard.—Surveys of fruit-growing in locality.

Study of fruit-tree twigs.

How to plant trees and set out an orchard.

How to prune old trees and renovate orchards.

The School.—Beautifying the school grounds and the roadside in front.

School Progress Clubs.—Organization and maintenance.

Monthly Topics for Form III

September

The flower of sweet pea and red clover; weeds, recognition of the commoner forms in the locality; agricultural products (native).

The house-fly and potato beetle as pests.

October

Weeds, further study and collection; fruit judging; mushrooms, characteristic features of the poisonous forms.

November

Agricultural products (introduced), a comparison of foreign with the native; pruning of fruit trees.

Poultry equipment; moulting fowl.

December

Farm problems, including areas of school gardens from plans, practical problems.

January

Breeds of Farm animals: dairy and beef breeds of cattle; heavy and light horses; long, medium and fine-woolled sheep; bacon hogs and fat hogs.

Germination of weed-seed collected the fall before so as to recognize the seedlings.

February

Germination tests of grains.

Study of twigs of fruit trees: fruit buds, leaf buds, scale insects.

March

Hot beds: structure, use and management.

Germination tests of grains: corn, oats, clover.

Preparation for school garden.

April

School gardens: plans and arrangements; preparation for intensive garden; cold frame, structure, use and management.

Treatment of oats for smut.

May

Definite plan for the school garden; planting, Arbor Day improvements; tree planting; shrub planting.

Incubator.

June

Care of school gardens; comparative study of the structure of the flowers of apple, pear, strawberry; soil cultivation; transplanting.

FORM IV

AGRICULTURE AND HORTICULTURE.—*The Farm*.—Weed seed impurities.

Structure of common grains and heads of wheat, oats, barley, corn.

Milk testing.

Drainage principles and plans.

Farm buildings and machinery.

Rotation of crops.

Growing improved oats, barley, alfalfa or corn.

Improving poultry.

Problems in arithmetic relating to the farm.

The Garden.—Structure of the flowers of the pea, bean, and pumpkin.

Window boxes and flower beds at school.

Making a hot-bed, cold frame.

Intensive gardening in the home or school garden or both.

Experiments and demonstrations with grains and roots in the school garden.

The Orchard.—Grafting.

Fruit blossoms and formation of fruit.

Care of an orchard; insects injurious to fruit trees and their treatment; treatment for fungus diseases.

Methods of packing and shipping fruit.

The School.—Beautifying the school grounds and the roadside in front.

School Progress Clubs.—Organization and maintenance.

Monthly Topics for Form IV*September*

Corn judging, practical lessons with ear corn and shelled corn.

Soil studies, classes of soils, effect of lime on clay, acid and alkaline soil, muck, loam.

October

Potato judging, study of the potato, treatment for scab, the potato beetle.

November

Fruit judging: apples, pears; packing fruit in boxes and barrels.

Poultry: the Mediterranean, Asiatic and American breeds, care of poultry, handling, packing and care of eggs.

December

Farm arithmetic, including mensuration of silos and the like.

Care of poultry and treatment of parasites, candling of eggs.

January

Grain judging; seed selection: wheat, oats, barley; testing seed, especially corn, for vitality.

February

Care of milk, milk utensils, the Babcock test for fat, simple tests for casein and albumen; butter, buttermaking.

The use and composition of fertilizers.

March

Preparation for planting the school garden; hot beds; selection of scions for grafting; pruning; spray mixtures; spray calendar.

April

School garden plans for plots, intensive garden explained and arranged for; cold frames; starting seeds in cold frames; treatment of oats for smut.

May

School garden work, planting seeds; Arbor Day improvements, tree-planting, shrub planting; incubator.

June

School garden work continued, planting and transplanting.

Study of the general structure of the flowers of the apple, pear, strawberry.

Study of soil, cultivation in the garden.

FORM V

In their present condition, few of the schools can take up the courses in Agriculture and Horticulture as prescribed for Form V. Accordingly, in schools which have a Fifth Form but which are unable to maintain all these courses, the pupils of such form may continue the courses prescribed for Form IV, with such topics of the courses for Form V as the Principal may select, with the Inspector's approval.

AGRICULTURE AND HORTICULTURE.—An elementary practical course:

Junior Grade: Botany, Physics, Gardening, Fruit-growing, Bee-keeping, Agricultural Arithmetic, Poultry, Dairying, Horticulture, Soil Studies, Insects.

Senior Grade: Botany, Physics, Chemistry, Gardening, Fruit-Growing, Farm Crops, Bee-keeping, Dairying, Horticulture, Insects, Bacteriology, Farm Animals, Rural Economics.

For the monthly topics of Form V, see under High Schools, the Course of Study for the Lower School, page 53.

Junior Public School Graduation Examination, 1917

AGRICULTURE AND HORTICULTURE

Values	
6	1. (a) State the more important precautions that should be taken to keep hens free from vermin.
8	(b) Give a good method of finishing poultry for market, indicating particularly the care and the feed.
9	2. Point out three uses of cultivation in a corn-field during the growing of the crop.
8	3. (a) Give, with drawings, the life history of <i>one</i> of the following:
4 + 4 =	potato beetle, common cut-worm.
8	(b) Outline a suitable method of combating each of these insect pests.
8	4. (a) Describe in detail the method usually employed in growing celery and in preparing it for market.
3 + 3 =	(b) Outline a good method of wintering celery (i) for table use,
6	(ii) for seed production.
9	5. (a) Describe the processes involved in butter-making from the time of milking to the time the butter is ready for the table.
4 + 4 =	(b) What is meant by (i) pasteurization, (ii) starters? What is
8	the special use of each in connection with the work of the dairy?
8	6. (a) Make a diagram to show the structure of a bee-hive.
6	(b) Name three important plants from which bees secure honey, stating the flowering season of each.
16	7. A man buys, at \$5.00 each, 20 pigs averaging 95 lbs. in weight. He feeds them on corn costing 65c. a bushel until they average 260 lbs. in weight, when he sells them at \$8.65 per cwt. Find his profit, assuming that one bushel of corn produces 11 lbs. of flesh.

Greater Production

The schools have taken an active part in greater food production in 1917. The following circular letter was sent to all the teachers of the Province:

Circular to Inspectors and Teachers.

INCREASED FOOD PRODUCTION.

In order to assist in meeting the shortage of foodstuffs, due to war conditions and the unfavourable season of 1916, those teachers who are now giving instruction in Agriculture and Horticulture in the Provincial schools should arrange, as far as practicable, to grow plants of food value in school gardens and to reduce correspondingly the space hitherto devoted to flowers and decorative shrubs. With the same object in view, the home garden projects should be enlarged and modified and extensive use made of vacant lots and other unoccupied areas. In this way advantage might be taken of the potential labour of boys and girls from eight to fifteen or sixteen, much of which in the ordinary course of events is not utilized.

Inspectors might also take advantage of present conditions to enlarge the scope of agricultural education in Ontario and to demonstrate more fully the important bearing which Agriculture has upon the welfare of the people, by using their influence to induce School Boards which have not yet established classes in Agriculture to undertake this work and to utilize the school garden or home garden as recommended above.

If, indeed, the urban municipalities in Ontario having a population of from 1,000 to 9,000 would double the present production of their gardens and poultry yards, and use, as recommended above, the vacant lots and other unoccupied areas, it would increase the food products of Ontario by \$10,000,000 at a very conservative calculation.

Boys and girls cannot be expected to fight, but by assisting in increasing the supply of foodstuffs, they also can be of service.

R. A. PYNE,
Minister of Education.

January 15th, 1917.

As a result of the above, a large number of schools undertook school garden work for the first time with very gratifying results. The home gardens were also stimulated, and the increase in food supply—chiefly potatoes and beans—was considerable.

A special feature of this greater production is outlined in the following circular letter:

To the Teachers of the Public and Separate Schools in Ontario.

GREATER PRODUCTION FOR 1917

By an arrangement with the Poultry Department of the O.A.C., Guelph, eggs for hatching can be supplied in a limited quantity for May delivery at 50 cents a dozen in 100-egg lots to pupils of schools in which classes in Agriculture are maintained. The eggs are from an improved Barred Rock bred-to-lay strain, and the introduction of this breed into the rural districts is likely to prove of lasting benefit to the whole country.

If the teachers are willing to take this matter up in connection with their classes, they should communicate with Professor Graham at the O.A.C., and secure at one shipment the number of eggs required for their schools.

It is suggested that part of the cost (say one-half) be borne by the School Board and part by the pupils, thus placing the cost to the pupil at so reasonable a figure that the project will be within reach of all. The part of the expense borne by the School Board may be charged to the Agricultural account (P.S. Regulations 1915, 16 (1), page 85) as the hatching of eggs and the rearing of the brood is a legitimate and useful home project for a pupil of the third, fourth or fifth form.

J. B. DANDENO,
Inspector of Elementary Agricultural Classes.

Toronto, January 29th, 1917.

In this project 152 Public and Separate Schools participated—30,940 eggs being secured for incubation. Eight Secondary Schools, under a similar arrangement, made use of 2,576 eggs.

A similar arrangement will be made for 1918, but the price of eggs will be higher.

An estimate of the results obtained from the campaign for greater production in 1917 may be given. The amount of food produced as a result of this movement, or the value of such food is, of course, difficult to estimate, but some idea may be obtained from the following: About 950 schools in Ontario are conducting classes in Agriculture at the present time, and of these about 600 have school



Home garden. De Forest Bell (age 9), Frankland School, Toronto. Teacher, Miss Armstrong, June, 1917.



Same garden, September, 1917.

gardens. These gardens vary from 6 or 8 square rods up to one acre. The crops grown were mainly potatoes or beans, but in many cases, general vegetables were produced. The value of food produced would reach on an average, taking the largest with the smallest, about \$7.50 for each school for the school gardens alone. This would make a total of \$4,500. The 350 schools which are not conducting school gardens are not considered in the above, nor are the home gardens of those pupils attending schools which have a school garden. It is not easy to obtain data

regarding home gardens, but it very frequently happens that one pupil produces as much in his home garden as that derived from the whole school garden. If we consider the results of the home gardens in addition to those of the school gardens the total would easily reach, when we consider the enhanced prices now prevailing, the sum of \$40,000.



Home Garden, Dorothy Poole (age 8), Frankland School, June, 1917



Same Garden, September, 1917

This amount may not seem large because of the nature of the problem and of the amount of land involved. The problem is educational rather than economic. But when we consider that the amount mentioned is an addition to the sum total of our food supply the result is very gratifying indeed.

The poultry project where 40,000 eggs were distributed under the arrangement outlined in the circular already quoted, resulted in the raising of 22,000 chickens of an approved strain of a utility breed. If these are worth 50 cents each—and many of them have been sold as high as \$2.00 apiece—it would mean an increase of \$11,000.

To sum up it may be said that through the efforts of pupils and teachers the total increase of foods due to this campaign is \$55,500.

For 1918 the home projects and school gardens are to be extended with results beneficial both to the country and to the pupils concerned.

Equipment

In order that the work may be effective, teachers must have suitable laboratory and illustrative material. The work is essentially practical, and good results can not be expected unless the teacher uses the laboratory method with suitable equipment.

As the Department pays in full for such equipment as may be needed there should be little difficulty in securing it. Many teachers are so wedded to book methods and similar routine that it is not easy, apparently, to break away. However, progress is being made, more particularly among those teachers who have taken the summer courses in Agriculture.

One difficulty in the way of securing equipment is that there is no suitable place to store it. In such cases teachers and Inspector should explain the matter to the Board, pointing out to them that certain pieces of equipment might be loaned to farmers in the neighbourhood after the class has completed the work involving such apparatus. The school—equipment and all—should be made use of by the people.

The following list of apparatus is recommended as suitable for elementary classes in Agriculture and is intended to be suggestive:

General

(Price estimated.)

Three small glass funnels	\$0 30
One half dozen glass tumblers	30
One half dozen glass fruit jars (sealers)	40
One dozen large test tubes (1 in. by 6 in.)	30
Measuring cylinder (graduate) 100 c.c.	75
Hydrometer, Baumé (for heavy liquids)	1 00
Hydrometer jar	45
Spirit lamp (with wood alcohol)	40
Thermometer, chemical, both C and F. (2 at 30c.)	60
Small bottle of hydrochloric acid	15
Small bottle of iodine (in K I)	15
Two litmus pads at 5c.	10

The following, dry, in large mouthed, cork stoppered bottles:—

Sodium nitrate, calcium phosphate, potassium chloride (or sulphate), copper sulphate, washing soda, baking soda, starch, lime, sulphur 10 cents each	90
Filter paper	10
Soup plates and saucers, a dozen each	60
Flower pots, 3 dozen 4 in.	1 08
Flats (boxes for planting seed)	20
Apple box to demonstrate packing	20
Surveyor's chain	2 50
Rain gauge	2 00
Garden tools as may be needed.	

Special

For special purposes, selections from the following may be made: (The teacher should write to a dealer for prices.)

For Poultry—

Model of feed hopper, trap nest, model of hen or chicken coop, incubator (may be borrowed).

For Beekeeping—

Standard Langstroth hive, complete; smoker, colony of bees in 10-frame hive.

For Field Crops—

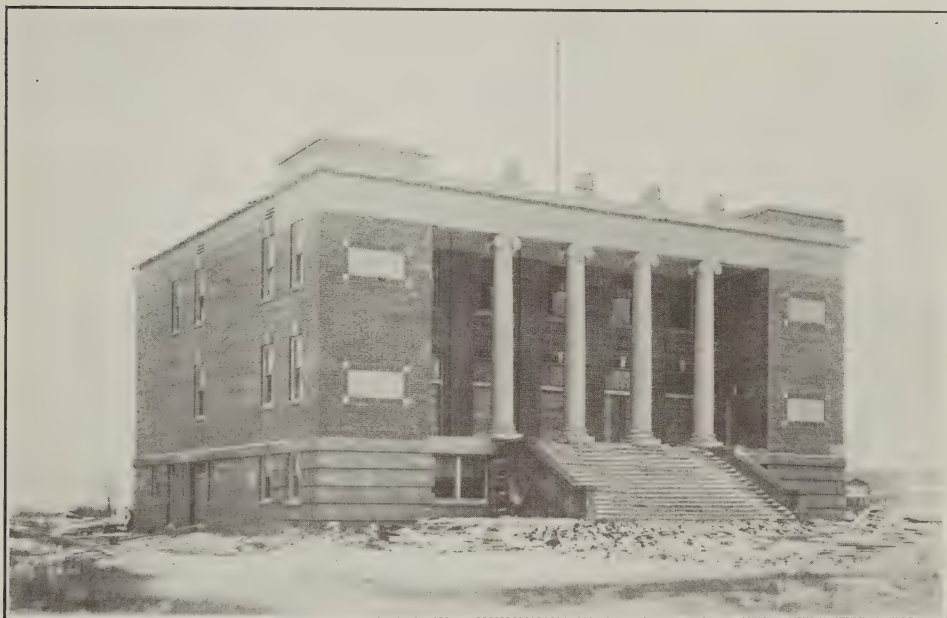
Set of grain measures, machine for treating grain for smut, samples of grains—wheat, rye, barley, buckwheat, rice in the hull, oats, etc.; fertilizers, weed seeds.

Horticulture—

Pruning and grafting tools, hand spraying outfit, hot bed (may be built permanently), cold frame, combined wheel cultivator and seeder.

For Dairying—

Lactometer, Babcock milk tester, milk scales, milk pail (modern), butter utensils, for illustration.



Beamsville High School. Provision is made in this building for departments of Agriculture and Household Science; cost \$30,000, including heating and ventilation. Science room, Household Science class room, Agricultural class room, and three other general class rooms—six in all. The building includes a large gymnasium with cloak-rooms, lavatories, lockers, etc., in the basement, and an assembly hall on the second floor. W. W. La Chance, Architect.

High Schools

The same plan as that employed in 1916 for visiting Secondary Schools which are conducting classes in Agriculture, was followed out in 1917, namely, to visit those commencing the work for the first time, twice during the year and other schools at least once. A large portion of my time is taken up attending other gatherings as indicated in the lists here given:

Schools Visited in 1917*Spring Term, 1917:*

Clinton	Hagersville	Drayton	Picton
Exeter	Arthur	Brockville	Oakville
Essex	Kincardine		

Fall Term, 1917:

Brockville	Woodstock	Niagara Falls S.	Winchester
London	Arthur	Oakville	Wingham
Picton	Athens	Port Hope	Drayton
Renfrew	Cobourg	Whitby	New Liskeard
Smith's Falls	Kincardine	Williamstown	Ridgeway

Attended the following 'Trustees' meetings at:

Kintore	Cooksville	Cornwall (H.S.)
Brampton	Albion	Maple
Woodstock (County Ass'n)	Caledon E.	Kleinberg
Woodstock (C.I.)	Agincourt	Sherkston
Cobourg (C.I.)	Drayton	Welland
Bluevale	Maxville	Newtonbrook (5 York)
Essex (County Ass'n)	Williamstown (H.S.)	

Normal Schools and Public Schools affiliated with them:—

Hamilton: Beach School.

London: No. 4 Westminster, No. 7 Westminster, No. 15 Westminster, Tecumseh.

North Bay: Feronia, 1 B Ferris.

Ottawa: No. 3 Gloucester, No. 14 Nepean, Normal Model.

Peterborough: No. 3 Smith, No. 5 Smith, No. 16 Otonabee.

Stratford: No. 3 Downie, No. 5 Downie, No. 9 Downie.

Toronto: Langstaff, Willowdale (4 York), Newtonbrook (5 York), Normal Model.

Public Schools other than those affiliated with the Normal Schools: Albion, Agincourt, Ridgeway, Stamford, Welland, Winchester, 6 Winchester, 10 Winchester, Chesterville, 8 Winchester, 5 Winchester, 11 Ameliasburg, 5 Hallowell, 11 Hallowell, 6 North Marysburg, Bloomfield.

School Fairs: Swansea (suburban), Withrow Ave. (Toronto), Frankland School (Toronto).

County Councils at: Pembroke, Whitby.

Teachers' Associations at: Picton (Pr. Edward Co.), Toronto (East and West York), Toronto (North York), Niagara Falls S. (Welland Co.), Hamilton (City Association).

The progress of the work in the Secondary Schools is indicated by the following table which shows where the work was introduced and how long continued. The word "Yes" means that the work was carried on successfully through the term,

and the word "No" indicates that the work was temporarily dropped. The reason assigned in each case for dropping the subject was because of the impossibility of securing a legally qualified teacher to teach Agriculture.

Schools	1915		1916		1917	
	Jan.-June	Sep.-Dec.	Jan.-June	Sep.-Dec.	Jan.-June	Sep.-Dec.
Collegiate Institutes—						
Brockville				yes	yes	yes
Clinton	yes	yes	yes	yes	yes	no
London						yes
Pictou	yes	yes	yes	yes	yes	yes
Renfrew				yes	yes	yes
Smith's Falls		yes	yes	yes	yes	yes
Vankleek Hill	yes	yes	yes	yes	yes	no
Woodstock						no
High Schools—						
Arthur	yes	yes	yes	yes	yes	yes
Athens						yes
Bowmanville	yes	yes	yes	no	no	no
Cobourg						yes
Essex				yes	yes	yes
Georgetown				yes	yes	no
Hagersville		yes	yes	yes	yes	no
Kincardine				yes	yes	yes
Niagara Falls, S	yes	yes	yes	yes	yes	yes
*Oakville	yes	yes	yes	yes	yes	yes
Port Hope						yes
Uxbridge						yes
*Whitby				yes	yes	yes
Williamstown						yes
Winchester	yes	yes	yes	yes	yes	yes
Wingham						yes
Continuation Schools—						
Cannington		yes	yes	yes	yes	no
*Drayton	yes	yes	yes	yes	yes	yes
Exeter	yes	yes	yes	yes	yes	no
New Liskeard		yes	yes	yes	yes	yes
Ridgeway	yes	yes	yes	yes	yes	yes

The chief difficulties in introducing and in maintaining classes in Agriculture in the Secondary Schools is the lack of legally qualified teachers. There are other difficulties but they are all, taken together, unimportant as compared with this. This scarcity of teachers shows itself mainly when a vacancy occurs as the result of the resignation of the teacher of Agriculture. This happened in five cases in 1917. The blame for this situation lies largely at the door of the Board. In some cases it is a small increase in salary, in others a lack of foresight in engaging a teacher and arranging for attendance of the teacher at such courses as are needed to qualify him, in still others it is a lack of knowledge of the special qualifications of teachers. But this should also be said in favour of Boards of Trustees in general: When the situation is explained to them they are easily induced to attempt to adapt their schools to the needs of progress.

Until Agriculture is recognized as a cultural subject of some importance leading to a course in a University it will be seriously handicapped in the High Schools. The colleges exert a tremendous influence upon the course of study in the High Schools, and the standard of admission to the college is made by the college. It

*Separate Departments of Agriculture.



Hiving a swarm which has recently left the school bee-hive, Sept. 26, 1917. New Liskeard Continuation School



Class securing swarm referred to in the preceding

is to be hoped that our Universities may see their way clear to give some recognition to Agriculture as a preparatory subject for entrance into the Universities.

As was expected, the teaching of Agriculture would not be confined to the limits of the school or the school grounds. The school has long been too much isolated in its work, and too far removed in aims and ideals, from the country in which it is located. Wherever a Department of Agriculture has been introduced extension work is being done, and it is hoped that short courses will be introduced to suit the needs of country people in winter. Such short courses should be so arranged that those living in the country could attend even for a part of the day. And it is hoped that the full staff of the High School will take part in contributing subjects other than Agriculture.

One instance of the extension movement is shown by the following letter:

DRAYTON, ONT., Nov. 24, 1917.

It is with considerable satisfaction that I report to you regarding the use that is being made of our agricultural equipment, especially our spraying outfit.

About the second week in July it looked as though we were going to lose our potato crop owing to late blight. We have a small tractor spray machine and a knapsack sprayer, and tried to draw the attention of the public to them. We prepared some Bordeaux Mixture and sprayed our own potatoes and several other small patches in the village. We then took our machines out to a farm about four miles to the north-west of the village and sprayed a potato patch. A few days later we took the knapsack sprayer out about five miles to the home of one of our students, who lived to the south-east, and sprayed a small patch of potatoes. Several other farmers then took advantage of our machines and they were kept busy for some time. In all, nine farmers used our machines, while many of the village gardeners used them. I may add that the knapsack sprayer is more popular than the hand tractor. About a week ago a gentleman borrowed it to spray his hen house and was pleased with it.

Yours truly,

GEO. A. CLARK.

The effort put forth to check late blight of potato as mentioned in the letter given above is more important than at first appears. This disease in 1917 caused a loss of about half the potato crop in New Brunswick, and also a very considerable loss in Ontario. The work done in the neighbourhood of Drayton may easily have saved more potatoes than would pay the cost of the school, and the gain is not for one year alone, because when farmers see the advantage they are eager enough to profit by it.

A practical instance of evidence of appreciation by a county council may be mentioned by way of congratulation to Halton County, and, also, by way of encouragement to other counties:

OAKVILLE, ONT., June 5th, 1917.

Statement regarding Agricultural Grant to Oakville High School by Halton County Council.

At the meeting of the Halton County Council on April 17th, 1917, a grant of five hundred dollars was made to the Oakville High School to assist in maintaining an Agricultural class, and generally promoting an interest among the students in practical agriculture.

This grant was made in accordance with Chapter 268, Sec. 33, Sub-Sec. 2, of the High School Act, R.S.O. 1914, and it is the intention to make this grant annually, with the proviso that the money be used exclusively for providing equipment and for the teaching of Agriculture. A special account is to be kept showing the expenditure.

The principal of the school, W. B. Wyndham, is a qualified instructor in Agriculture, having secured his certificate from the Department of Education by attendance at the Summer Courses at the Ontario Agricultural College. This is an important feature in order to secure the most useful practical results. The students have manifested a keen interest.

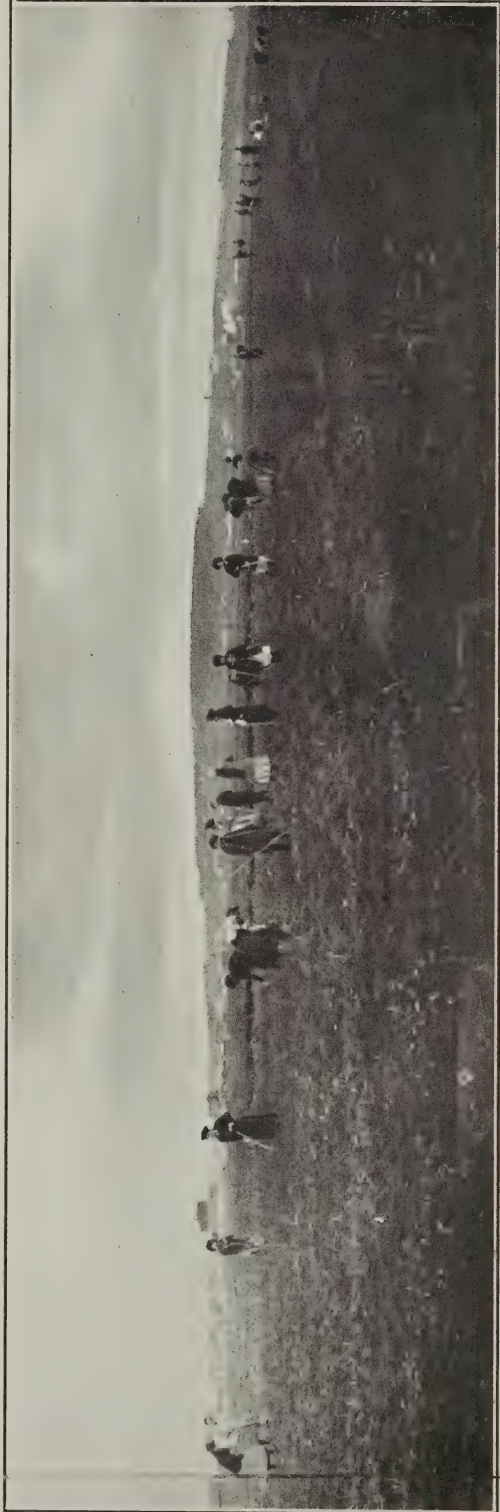
A. S. FORSTER,

Reeve.

ONE INSTANCE OF GREATER PRODUCTION

While the food problem is acute, and this is likely to be the case for several years even after the war is over, teachers and boards are strongly recommended to adopt some method of food production which will utilize the services of the pupils. The New Liskeard Continuation School, as indicated in this illustration, has made a praiseworthy attempt in this direction, carrying on the usual school classes with good success at the same time. There is no better way of teaching agriculture or horticulture than by making use of such a project, following it up with suitable instruction from time to time during the growing season. As will be seen in the illustration, girls outnumbered the boys, and the fact that the subject of the picture is "potato production" does not detract one iota from its value as a work of art. The girls look happy in this work even though it might properly be called man's work, and the physical exercise they obtain in such useful employment is no less effective and health-producing than if done in a five-thousand-dollar gymnasium.

To manage such classes in useful out-door work of this character is no more difficult than the management of ordinary classes in the school room, and the education the pupils receive, while managing a potato plot in the open air, is just as important, so far as it goes, as solving a problem in Algebra, translating a page of Latin, or learning a chapter of Ancient History.



"Greater Production," 1917. One acre of potatoes; harvesting the crop; Agricultural class at work in the field. New Liskeard Continuation School

The Training of Teachers for High Schools

As has been pointed out the chief difficulty in the way of introducing Agriculture into the Secondary Schools of Ontario is the lack of qualified teachers. Courses are provided at the Ontario Agricultural College covering two consecutive summers of five weeks each. These courses were introduced in 1913 and the following teachers so far have qualified:

1914	
John A. Bell.	Alex. R. McRitchie, B.A., Toronto.
Geo. A. Campbell.	Alex. Pearson, B.A., Toronto.
Geo. A. Clark.	Edmund Pugsley, B.A., Victoria.
J. B. Dandeno, B.A., Q'ns., A.M., Ph.D., Harv.	Fred Sine, M.A., B.Sc., Queen's.
James L. Mitchener, B.A., McMaster	Arthur M. Woodley.
Wm. J. Morrison, B.A., Toronto.	Wm. B. Wyndham, B.A., Toronto.
1915	
Wm. Bowden.	John P. Hume, B.A., Queen's.
*Wm. G. Butson.	John A. Macdonald.
Edward J. Corkill, B.A., Queen's.	Geo. O. McMillan, M.A., B.Pæd., Q'ns.
Robt. W. Fleming.	Muriel A. Shook.
**Chas. S. Gulston.	Geo. B. Spark, B.A., Toronto.
1916	
John G. Adams, B.A., Queen's.	Hugh H. Graham, B.A., Queen's.
Edwin T. Bell, B.A., McMaster.	Hugh J. Haviland, B.A., Toronto.
Geo. W. Bunton, B.A., Queen's.	Gideon A. Miller, M.A., Queen's.
Geo. E. Copeland, M.A., Queen's.	W. A. Porter.
Isabella E. Dobbie.	Walter E. Shales, M.A., Queen's.
Wm. Donaldson, B.A., Toronto.	Daniel E. Smith, B.A., Queen's.
Clarence Elliott.	Christopher Summers.
F. V. Elliott	
1917	
J. A. Anderson, B.A., Queen's.	G. E. Pentland, M.A., Queen's.
Norman Davies, B.A., McMaster.	H. E. Ricker, M.A., Queen's.
W. M. Erwin, B.A., Queen's.	P. M. Shorey, B.A., B.Sc., Queen's.
Ishbel A. Foster.	J. A. Short.
Helen E. Foster.	F. P. Smith, M.A., Queen's.
W. D. Hay, B.A., Queen's.	T. C. Smith, B.A., Queen's.
G. S. Johnson, B.A., McMaster.	D. A. Welsh, B.A., Toronto.
A. J. Madill, B.A., McMaster.	

Summary:—

Queen's	20
Toronto	7
McMaster	5
Victoria	1
Western	1

With university degrees 34

Without university degrees 18

*Killed at Vimy Ridge.

**Enlisted in the Naval Service.

A four weeks' course in Farm Mechanics, given for the first time in 1917, as a Summer Course, was attended by 10 students, all of whom received certificates:

G. A. Clark.	W. D. Hay, B.A., Queen's.
J. B. Dandeno, B.A., Queen's; A.M., Ph.D., Harv.	G. S. Johnson, B.A., McMaster.
Norman Davies, B.A., McMaster.	A. J. Madill, B.A., McMaster.
Isabel E. Dobbie.	P. M. Shorey, B.A., B.Sc., Queen's.
F. V. Elliott, B.A., Western.	W. B. Wyndham, B.A., Toronto.

The influence of the High School classes is now being felt in the farming community and reports come from all sides that such work is highly appreciated. The following letter, from a farmer who has two children taking the classes in the Oakville High School, represents something of the general appreciation:

PALERMO, Oct. 18th, 1917.

In answer to your question regarding the teaching of Agriculture in High Schools, I wish to say, briefly, that I consider it as one of the most important subjects that should be taught, especially in the smaller towns where there are a great number of scholars who have been brought up on the farms.

From personal observation I see the people who endeavour to enlighten themselves by reading up all the farm questions are the most successful farmers. If these subjects had been advanced say twenty years ago farming would be on a higher plane to-day.

On the other hand in the city schools where there is no possibility of five per cent. ever going on the farm, it seems to me it should not be enforced on the pupils.

JOHN DEARING.

Home projects are always useful and can be made very effective from an educational point of view. These projects assume a great variety of forms, but the commonest is the home garden. One project presented by Seto Hong, a Chinese student in attendance at the Ridgeway Continuation School, is here given:

1917 Home Garden

The area cultivated was about 1,500 square feet.
The cost is given in the following order:

1 Ploughing and harrowing	\$1.00
2 Tools	1.75
3 Seeds	1.95

Total cost and expense \$4.70

The time was estimated at the average of about one hour a day from the middle of April to the middle of September.

The articles raised were:

1. Potatoes.	5. Lettuce.	9. Peas.	13. Celery.
2. Sugar beets.	6. Onions.	10. Beans.	14. Cabbage.
3. Turnips.	7. Squash	11. Pumpkins.	15. Cauliflower.
4. Carrots.	8. Corn.	12. Chinese peas.	16. Chinese cabbage.
	17. Chinese greens of two kinds.		

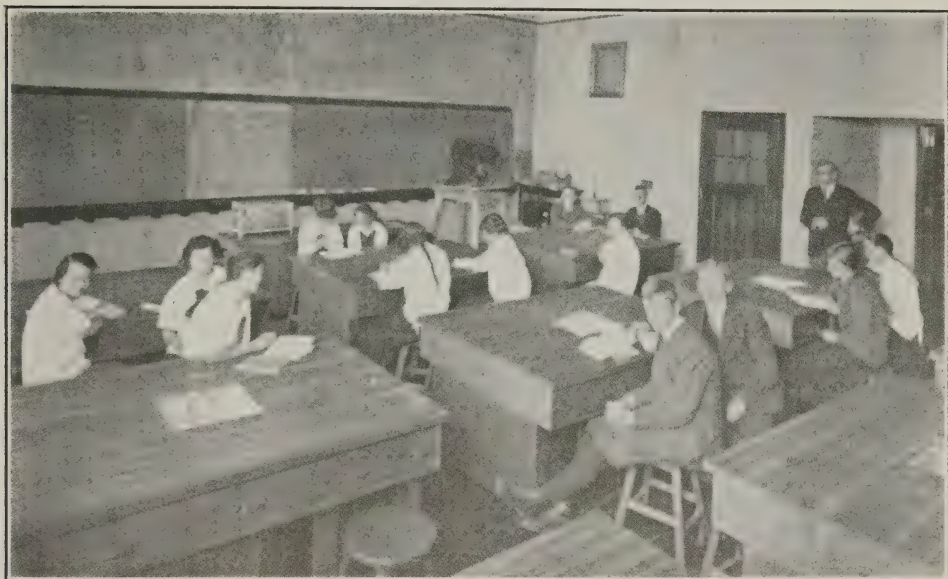
The estimated value is as follows:

1. Potatoes, 3½ bus. at \$1.00... \$3 50	11. Pumpkins, 2 at 30c. 60
2. Sugar beets, 100 lbs. at ½c. .. 50	12. Chinese peas, 3 pks. at 60c... 1 80
3. Turnips, 120 lbs. at 1c. 1 20	13. Celery, 200 at 2c. 4 00
4. Carrots, 150 lbs. at 2c. 3 00	14. Cabbage, 12 heads at 5c. 60
5. Lettuce 2 00	15. Cauliflower 25
6. Onions, 30 lbs. at 8c. 2 40	16. Chinese cabbage 2 00
7. Squash, 15 at 10c. 1 50	17. Chinese greens 3 00
8. Corn, 3 doz. at 20c. 60	
9. Peas, 1 pk. at 50c. 50	Total value \$29 95
10. Beans, 5 pks. at 50c. 2 50	

The lessons learned were:

- (1) That potato eyes cut from peelings will not give as good results as thicker pieces of potato do.
- (2) That beans and corn will rot if planted in April.
- (3) The greens, lettuce, and cabbage, etc., will grow to a larger head if not so crowded.
- (4) That Cabbage-butterflies are great destroyers of cabbages and cauliflowers.

This project though, perhaps, of no great financial importance, shows how arithmetic, composition and commercial work bear upon the teaching of Agriculture. And who will say that the boy who completed this project did not obtain as much of real education as if he learned to translate a chapter of Cæsar?



Laboratory to be used partly for work in Agriculture, Whitby H. S. This school introduced a Department of Agriculture in 1916.



Home Projects. In five months this pair should be worth \$70.00. "Sir Yorkshire Bacon." Whitby High School



Beef Production. Win-the-War by growing beef. Whitby High School.

The Employment of School Boys and Girls on the Farm

A large number of pupils took advantage of the regulation issued by the Department of Education respecting the exemption from a formal examination at the close of the school year, providing a successful course had been pursued up to April 20th, and providing a successful examination had been passed upon such course as arranged by the schools concerned. In some districts of the Province considerable use was made of this privilege, and no doubt greater production was stimulated thereby. Actual results are not easy to obtain showing specifically to what extent this proved beneficial, but a glance at the following table concerning one school—the Picton Collegiate Institute—will show how it was arranged and followed up:

Picton Collegiate Institute

I. Candidates volunteering for employment on farms, 1917

Class	No. of pupils	Average age	Accustomed to farm	Employment arranged	Positions away from home	Average date work commenced	For Nor. Entrance, Parts I and II	Nor. Entrance, Part II and Matric.	Normal Entrance, Part II	Faculty Entrance, Part II
Boys—										
Lower School.	36	15	31	30	13	June 10				
Middle School.	4	17.5	4	3	2	June 29				
Upper School..	2	16	2	2	.....	June 29				
Girls—										
Lower School..	22	16	22	22	2	June 17				
Middle School.	5	17.2	2	3	2	June 29				

II. Candidates for certificates under circular 27

Boys	9	17.5	8	9	8	April 21	3	3	1	2
Girls	11	17	8	11	3	April 21	3	6	2	..

An examination of the foregoing list brings out the following: (1) Girls as well as boys have entered into this arrangement. (2) A large proportion of the classes undertook employment away from home. (3) Practically all who desired employment secured it before April 21st.

Agricultural Departments in High Schools

As has been shown in the list three schools—Whitby, Drayton and Oakville—have introduced Departments of Agriculture, and one of these—Whitby—has added a course in Farm Mechanics. In addition to these schools, two others are planning to commence the work on the Department arrangement in 1918. Where Departments have been introduced arrangements are being made to conduct short courses during the winter months. To these short courses will be admitted any persons who are likely to profit by such courses. It is intended that the whole staff of the High School will be available to give instruction on subjects other than those which may be considered strictly agricultural. The hours for attendance upon classes may be arranged entirely to suit the convenience of those concerned. From this it is apparent that such schools are undertaking a work in extending the advantages of the High School to the surrounding community.



Oakville High School. "Greater Production," 1917. Experimental plot of potatoes. This school introduced a department of Agriculture, January 1st, 1918.



Oakville High School Class taking levels for drains.

War Situation

The war situation is giving an extraordinary stimulus to the schools towards the end of greater production. And there is no group of more doughty warriors than the pupils, both boys and girls, of the rural schools. The great need is leadership, and the teachers are realizing as never before that there are other important duties, devolving upon them—duties not confined to the four walls of the school, nor yet within the covers of the text-books.

Two of the teachers of Agriculture in the High Schools have enlisted, and one of them, Mr. W. G. Butson, paid the utmost price with his life at Vimy Ridge; the other, Mr. C. S. Gulston, enlisted in the Royal Navy as wireless operator and is now on active service. Mr. Butson taught Agriculture in the Bowmanville High School, and Mr. Gulston in the Picton Collegiate Institute.



New Liskeard Continuation School. Agricultural Class (girls) Mending Harness

Commercial Fertilizers

The study of commercial fertilizers in the Primary or Secondary Schools is of considerable importance as an economic problem, and it may be made educationally attractive if such study were correlated with Arithmetic and Elementary Chemistry. But, in many of the text books on Agriculture, the older chemical names are so persistently made use of that the ordinary High School student, and, in some cases, even the teachers, cannot recognize in terms of the High School chemistry, the technical language used in the agricultural texts.

The usual terms used in agricultural books and bulletins for the important constituents of commercial fertilizers are phosphoric acid, potash and nitrogen.

The names phosphoric acid and potash are too indefinite to be of any use to a High School student; in fact they are quite erroneous and misleading. It would be a great improvement if the names of the essential elements concerned were used, for example, potassium for potash and phosphorus for phosphoric acid. The name nitrogen is correctly used.

The usual practice in agricultural books is to calculate the phosphorus in terms of the oxide of phosphorus and the potassium in terms of the oxide of potassium. The compounds from which these elements are obtained by plants in the soil are usually, though not always, acid phosphate or superphosphate of calcium, potassium chloride, and sodium nitrate.

What is meant by phosphoric acid is, as has just been said, phosphorus pentox-



New Liskeard Continuation School. Agricultural Class (boys) Mending Harness

ide (P_2O_5), which is not an acid at all. By potash is meant the oxide, (K_2O). When reckoning the composition of a fertilizer the amount of phosphoric acid (so-called) is really the amount of the pentoxide. In calculating the amount of potash, it is really the amount of the oxide. With respect to nitrogen the name is properly applied.

For example, suppose we assume a fertilizer having the advertised formula 2, 10, 8, meaning 2 per cent. of nitrogen, 10 per cent. of phosphorus pentoxide, and 8 per cent. of potassium oxide, though it would read in the terms of the agricultural texts, 2 per cent. of nitrogen, 10 per cent. phosphoric acid and 8 per cent. potash. To show how this works out assume the following atomic weights: $P=31$; $O=16$; $K=39$; $N=14$; $H=1$; $Ca=40$; $Na=23$; $Cl=35$.

The ordinary compounds from which phosphorus, potassium and nitrogen are obtained are: Acid phosphate, CaHPO_4 ; potassium chloride, KCl ; sodium nitrate, NaNO_3 , respectively. The proportion of phosphorus in acid phosphate is $31 \div (40+1+31+64)$ or 22.8 per cent. In potassium chloride (muriate of potash) the proportion of potassium is $39 \div (39+35)$ or 52.7 per cent. In sodium nitrate the proportion of nitrogen is $14 \div (23+14+48)$ or 16.4 per cent. The proportion of phosphorus in the pentoxide is $62 \div (62+80)$ or 43.7 per cent. The proportion of potassium in potassium oxide is $78 \div (78+16)$ or 83 per cent. A fertilizer whose formula was 2, 10, 8, would, therefore, contain 2 per cent. of nitrogen, 10 per cent. of P_2O_5 , 8 per cent. of K_2O , and from this we calculate the proportions of the elements referred to as follows:

$$\begin{array}{rcll} 2 \times \frac{100}{100} & \text{gives } 2, & \text{the percentage of nitrogen.} \\ 10 \times \frac{43}{100} & \text{" } 4.3, & \text{" } & \text{" phosphorus.} \\ 8 \times \frac{83}{100} & \text{" } 6.64, & \text{" } & \text{" potassium.} \end{array}$$

The 2, 10, 8, formula should read 2, 4.3, 6.4 for the elements nitrogen, phosphorus and potassium. Similarly a formula 2, 7, 8 should read 2, $7 \times \frac{43}{100}$, $8 \times \frac{83}{100}$ for the elements in the same order. Therefore, to convert values of phosphorus into values of phosphoric acid (so-called) multiply by 2.29, and to convert values of phosphoric acid into values of phosphorus multiply by .43. To convert values of potassium into values of potash multiply by 1.2, and to convert values of potash into values of potassium multiply by .83.

In other words potassium is to potash as 78 is to 94, and phosphorus is to phosphoric acid (so-called) as 62 is to 142.

Supposing a farmer wishes to secure a fertilizer of the formula 2, 6, 4, and wishes to mix it himself. If he needs one ton of such mixture how much of each of acid calcium phosphate (Ca H PO_4), of potassium chloride, and nitrate of soda should he buy?

$$\begin{array}{l} 2 \text{ per cent. of } 2,000 \text{ lbs.} = 40 \text{ lbs.} \\ 6 \text{ per cent. of } 2,000 \text{ lbs.} = 120 \text{ lbs.} \\ 4 \text{ per cent. of } 2,000 \text{ lbs.} = 80 \text{ lbs.} \end{array}$$

Since nitrogen is $\frac{14}{85}$ of the nitrate he must secure $\frac{85}{14} \times 40 = 243$ lbs., but 120 lbs. of phosphoric acid contains $120 \times .43 = 51.6$ of phosphorus, and 80 lbs. potash contains $80 \times .83 = 66.4$ lbs. potassium.

Therefore, since phosphorus is only 22.8 per cent. of the phosphate we must secure $\frac{100}{22.8} \times \frac{51.6}{1} = 227$ lbs. of phosphate and $\frac{100}{52.7} \times \frac{66.4}{1} = 126$ lbs. of potassium chloride.

Then the farmer must buy:

Nitrate of soda	243 lbs.
Acid calcium phosphate	227 lbs.
Muriate of potash	126 lbs.
	<hr/>
	596 lbs.

The remainder of the ton should be made up of filler which is often simply road dust.

Normal Schools

All the Normal Schools were visited at least once during the school year and considerable progress was noted, especially in some of the schools, in rendering effective, with the means at their disposal, the teaching of Agriculture. As mentioned

in my report in 1916, first-class work cannot be expected until greenhouses are provided. When the Normal Schools were built, no particular attention was given towards providing accommodation for classes in Agriculture, consequently the class-room is not all that could be desired. The class-rooms used for teaching Science are of some use for giving instruction in practical Agriculture, but they are not adequate. If greenhouses were provided, this condition would be much improved.

The scholastic theory, as to the close kinship between wisdom and learning took firm root in the long period when Latin was, to some extent, an official language. Scholastic influence thrived all through this long period when there were few books except those in Greek and Latin. To pore over such abstruse books was the hallmark of a great mind, and the more energy and zeal displayed in this direction, the more authors read, the greater the reputation for wisdom. For, though learning



Toronto Normal Model School Boys, Senior III, harvesting crop, October, 1917

wise words and repeating wise words may be mistaken for wisdom, the two things are quite distinct as time has already shown.

The aim of education is to produce thought and reflection and to improve the thinking faculty. The effect of much reading is a tendency to prompt a man to try and remember what has been said, and to accept an authority, and to be annoyed with those who presume to have an opinion without having read the authorities.

It has not been difficult in the past, when money was needed to endow a school for language, a Chair of Greek History or a Department of Astronomy, to secure liberal financial aid for the purpose. What real good these do the people it is not easy to see. A greenhouse for a Normal School is a different matter. It is of some use.

Our methods are not yet sufficiently practical. We expect too much book work, too much writing. This may be illustrated by a quotation from Viscount Harberton:

I was quite horrified to hear of a soldier "plucked" in an examination in which he had been asked to explain on paper how to clean an ordinary magazine rifle. He asked to have a rifle brought him, and, on this being negatived, he refused to answer the question. What, he argued, could be more stupid than to ask a man to explain how to clean a rifle without putting a rifle into his hands so that he could show how to clean it? His view is sound. The literary man is the opposite.



Toronto Normal Model School, Girls, Senior IV, harvesting their crop

Those in charge of the classes in Agriculture should aim, as far as possible, to provide material with which the students should work. Laboratory work is essential.

The Normal Schools will be able to do much better work in teaching Agriculture when the students have had, in the High Schools, a course of practical work, and when greenhouses will have been installed.

Three of the teachers, Mr. McMillan, Hamilton, Mr. Ricker, North Bay, and Mr. Miller, Ottawa, hold Intermediate certificates in Agriculture.

In order to make the teaching of Agriculture effective it will always be necessary to maintain a strong course in the Normal Schools. The Normal Model Schools in Toronto and Ottawa are making a praiseworthy effort to co-operate, and it is to be hoped that in a short time regular instruction will be given in Agriculture and in School Garden work, to the Normal Model classes by teachers who have had training in Agriculture.



Toronto Normal Model. School Garden, Oct. 1917.

That the movement is being understood and appreciated is manifested in the following statement:

TORONTO, November 28th, 1917.

The members of the staff of the Toronto Normal Model School are agreed that as an educational factor the school garden for the year 1917 was a very decided success. A much larger area than formerly was under cultivation and every class in the school was given an opportunity to do something in the garden. The class plot and the individual plot were both used, and both proved quite satisfactory. Care was taken to correlate the work with other subjects of the course. The results of the effort were seen in the increased interest on the part of the pupils in the home gardens and in their success in making gardens where there had been none before. The children with every evidence of pride and delight took home their produce, which, in most cases, was excellent in quality and abundant in quantity. The garden proved a great source of interest and instruction to the passers-by, many of whom followed the work throughout the season. Pupils and teachers are looking forward with pleasure to the next season when increased effort will be made to utilize every educational possibility which the garden presents.

M. A. SORSOLIEL,
Acting Headmaster.

The schools affiliated with the Normal Schools are given in the following list. These schools have all made a good start and it is hoped that efforts for advancement of such schools may be fostered and encouraged in every possible way. It is also hoped that some of these schools may, in the near future, become centres of consolidation.

Schools Affiliated					Teacher of Affiliated School						
Normal School	Section No.	Township	Date of affiliation	Miles from Normal	Secretary	P.O. Address	Name of Teacher	Cert.	Certificate in Agricul.	Salary from Board	Salary from Dept.
Hamilton	5 Burlington	Barton	Sept., 1916	2	Lees Beckett.....	Mt. Top, Hamilton } Hamilton R.R. 2, Ancaster	Robina Wiley...	I	Pt. I, 1917	\$650 com.	\$200
		“ “	“	6	Burlington B. Commis- sion, room 800, Bank of Hamilton		CharlotteHowlett	I	“ I, 1917	\$700	200
		Ancaster ...	“	11	Wm. Robinson		Grace Grinver ..	II	“ I, 1917	625	200
Stratford	3 5 9	Downie	1909	5½	D. M. Ballantyne.....	R.R. 3, Stratford.....	Hazel Yates	II	Pt. I, 1917	600	200
		“ “	1916	4	R. J. Dunseith	R.R. 1, St. Paul's.....	Evelyn Bradshaw	II	Cert.,	600	200
		“ “	1916	7½	Wm. Muir	R.R. 5, St. Mary's.....	M. McCully.....	II	Cert.	700	200
Peterborough.	3 5 6	Smith	Sept., 1916	3	Geo. Milburn.....	R.R. 1, Peterborough ..	Kate McLean...	II	Pt. I, 1917	600	200
		“ “	“	6	G. D. Mann	Bridgenorth	M. I. Kinck	II	Cert.	600	200
		Otonabee ...	“	3	Alex. Huston.....	R.R. 6, Peterborough ..	Sara Hamilton...	II	Cert.	650	200
London	7 4 15	Westminster	Sept., 1916	4	Andrew Elliott.....	R.R. 1, Wilton Grove...	R. J. Shaw	II	No Cert.	600	200
		“ “	“	2½	J. Morton	Tambury's Corners....	May Beckett....	II	Pt. I, 1916	600	200
		“ “	“	10	Frank McPherson	R.R. 3, Lambeth.....	Nellie Auckland..	II	Cert.	640	200
North Bay...	5 1B	Widdifield ..	Sept., 1916	9	Jas. Daley.....	Feronia	Lloyd Nesbitt...	II	No Cert.	600	200
		Ferris	“	2	James Pasmore.....	North Bay.....	Vina Fennell....	II	Pt. I, 1917	600	200
Ottawa	14 3 3	Nepean	Sept., 1916	3	Thomas Mulligan.....	R.R. 1, Hintonburg....	Margaret Innes.	II	No Cert.	650	200
		Gloucester...	“	4	John Beamish	Billing's Bridge.....	E. Lovina Rose..	II	Pt. I, 1917	650	200
		Nepean	“	7	W. F. Bell	R.R. 1, Britannia Bay..	Geo. Grierson...	II	“ I, 1917	600	200
Toronto	5 4 U22	York	Sept., 1916	9	G. R. Goulding	Newtonbrook.....	Rubena Munro..	II	Cert.	700	200
		“ “	“	6	Jno. McKenzie	Willowdale	M. A. Beatty....	II	No. Cert.	700	200
		Vaughan and Markham	Sept., 1917	12	David James.....	Thornhill.....	C. A. Binnie	II	Pt. I, 1915	600	200

NORMAL SCHOOL COURSE OF STUDY

Agriculture and Horticulture

The special object of the course in Agriculture is to prepare the teacher-in-training to train his pupils for the occupations of the farm and to broaden and deepen their interest in nature and their sympathy with rural life.

The course includes the following topics:

Dairying: Care of milk and butter; Pasteurization, churning, separating; the use of the Babcock tester and the lactometer.

Poultry: Utility breeds; care of poultry; care, shipping, candling and marketing of eggs.

Breeds of Farm Animals: Pigs, horses, sheep.

Field Crops: Identification of seeds; seed testing; corn judging; seed selection; cover crops; discussion of weed seed impurities and of economic plants; simple classification of soils; principles and plans of drainage; crop rotation.

Horticulture: Pruning; spraying; grafting; packing and shipping fruit; care of garden and house plants; making a hot-bed and cold frame; fungicides.

Birds and Insects: Those of the most importance in their relation to agriculture; insecticides.

Experimental Plots: Preparation and planting to illustrate the benefits of seed selection; the rotation of crops; growing improved oats, barley, alfalfa.

School Gardens: The purpose of school gardens; their relation to nature study, agriculture, and horticulture; planning and plotting school gardens; work in the school garden by the teachers-in-training; observation and supervision of the work done by the pupils of the urban and rural Model Schools; care of the pupils' school gardens during the summer vacation; care of tools and machinery.

School Grounds: Planning; planting of trees, shrubs, and ornamental plants.

Home Projects: Direction of pupils' home work; inspection of records in pupils' note-books; inspection of home work by teachers.

School Progress Clubs: General scope and management.

School Fairs: Their use in connection with the teaching of Agriculture.

BOOKS OF REFERENCE:—

Waters: *The Essentials of Agriculture*.

Warren: *Elements of Agriculture*.

Burkett, Stevens and Hill: *Agriculture for Beginners*.

INSTRUCTION.—By special arrangement with the publishers, teachers-in-training may obtain at the Normal School copies of *The Essentials of Agriculture* at a reduced cost. The Principal will make an announcement on the subject as soon as the school opens.

The equipment for teaching Agriculture in the Normal Schools, obtained through the Federal appropriation, is given in the following summary:

Equipment for Agriculture in Normal Schools

Normal School	Equipment	Books	Other material
	\$ c.	\$ c.	\$ c.
Hamilton	76 38	11 75	105 42
London	101 50	26 20	168 50
North Bay	94 01		
Ottawa			
Peterboro	66 11		22 08
Stratford	176 90	30 00	50 00
Toronto	223 55		44 85



Teachers from East Middlesex in attendance on the Summer Courses in Agriculture, O.A.C., 1917

Summer Courses in Agriculture for Teachers

By an arrangement made between the Departments of Education and Agriculture, courses of study are provided at the Ontario Agricultural College for teachers who expect to teach Agriculture in either Primary or Secondary Schools. The course of study for teachers of Primary Schools is divided into two parts, each of five weeks duration, and taken in two consecutive summers. On the successful completion of these two parts a certificate in Agriculture is awarded. The chief aim of these short courses, which commence about July 3rd, is to prepare teachers to give instruction in Elementary Agriculture and Horticulture in the schools of Ontario.

The course of study provided for teachers of Secondary Schools is similarly arranged and divided, and runs concurrently with that of the course for teachers of Primary Schools.

A course in Farm Mechanics, open to teachers holding Intermediate certificates in Agriculture was given, commencing immediately at the close of the usual summer session. This course covered four weeks and comprised studies in forge work, wood work and cement work, including, also, repairs of harness, ropes, etc. The aim in this course is to provide practical exercises especially applicable to farm life.

Ten students took this course, a list of whom is given under "Training of Teachers," page 81.

The number in attendance, as compared with previous years, is given in the following summary:

Year	Elementary				Intermediate				Total
	Part I		Part II		Part I		Part II		
	Men	Women	Men	Women	Men	Women	Men	Women	
1911..	8	75	1	16	.....	.....	.....	.....	100
1912..	16	65	2	23	.....	.....	.....	.....	106
1913..	14	64	5	36	*23	4	.....	.....	146
1914..	8	55	5	27	13	4	14	.....	126
1915..	15	39	5	18	17	1	9	1	105
1916..	11	99	9	31	15	3	14	1	183
1917..	15	138	7	81	9	1	13	2	266

*Seven of these were teachers from the Normal Schools.

During the term a course of ten lectures was given by Mr. H. Foght, specialist in rural Education of the Bureau of Education, Washington, on the following subjects:

1. The Rural Problem Analyzed in Relation to its Educational, Social, and Religious Elements.
2. Institutional Means for Remaking Rural Life.
3. The Farmer's Wife, a Vital Factor in the Problem.
4. The Teacher and Community Leadership.
5. The Complete Rural Community School (illustrated).
6. Good Roads and Education (illustrated).
7. What Every Teacher Can Do for the Advancement of Vocational Education (illustrated).
8. The Teacher and the Play-Life of the School (illustrated).
9. The Meaning of Modern Sanitation in School and Home (illustrated).
10. The Revitalized Course of Study for Rural Schools.

These lectures formed a part of the courses for all teachers.

The activities outside of the regular classes consisted in instruction and practice in games and sports suitable for schools. A pageant was given one Saturday afternoon representing "The Call of the Country." Regular instruction in swimming was provided for women students in the swimming tank of the College gymnasium with pronounced success. Upwards of seventy of the teachers learned to swim to the extent that at least a dozen strokes as a minimum was accomplished.

The School garden forms an important part of the first year's work. The Macdonald Consolidated School gardens are available for class purposes through an arrangement made with the Board of Trustees and the Horticultural Department

of the College. This garden illustrates what may be done in the way of crop production as there was in 1917 an immense crop of vegetables of various kinds.

Practically all of the teachers in attendance roomed and boarded at the College. This arrangement gave opportunity for participation in games and sports, and a chance for mutual acquaintance among the teachers. Two Saturday excursions were provided, one to the "Rocks" of Elora and the other to the "Pot Holes" of Rockwood.

At the close of the Summer Courses at the College, a considerable number of the teachers made arrangements to assist in harvesting the crop of small fruits, some in Norfolk County, and others in the Grimsby district. It is very gratifying, indeed, to note that these teachers gave up all their vacation in the interests of agriculture and crop production. Some teachers made a hurried trip to their schools to supervise their school garden plots before engaging in the harvesting of the fruit crop.

SUMMER SCHOOL COURSES OF STUDY

Courses for the Certificate in Elementary Agriculture and Horticulture

The following are the Courses for teachers' certificates in Elementary Agriculture and Horticulture:

PART I

School Gardening: Planning and managing garden plots (each student will prepare and care for a plot); cultivating of garden plots; care of tools; use of combined seeder and cultivator; garden weeds.

Field Husbandry: Study of crops; grains; grasses; clovers; potatoes; roots; rotation of crops.

Entomology: Collections; examination and identification of common insects of garden, field, and orchard; parasites on domestic animals and in households.

Horticulture: General study of fruits and vegetables; combating fungus and insect pests; spray mixtures and methods of application; hot beds and cold frames.

Floriculture: Propagation by cuttings; varieties for perennial borders; method of potting and re-potting; compost heaps.

Botany: Collection of plants; examination and identification of weeds and weed-seeds; identification of the common native trees; physiological experiments.

Live Stock: Lectures and practical demonstrations on breeds of cattle, horses, sheep and swine.

Dairying: Lectures and demonstrations; care of milk; the dairy cow; composition of milk; testing for milk fat; butter making; cheese making.

Poultry: Breeds; candling of eggs; use of incubator; care of poultry.

Soils: Classification of the kinds of soil; measurements of moisture in soil; cultivation; effects of frost and air upon the elements of soil; fertility.

Weather: Climate; air movements; air pressures; storms; weather maps; records; forecasts.

Organization and Methods: Course of Study; the Regulations of the Department of Education; equipment; laboratory and class methods; management of home gardens; school fairs; plans for Winter Reading Course.

PART II

Botany: Plant diseases; identification of wild plants; study of grasses and cereals. Collection presented (this may be worked out during the year previous to this course).

Chemistry: A study of plants and their food requirements and soils; manures and fertilizers in relation to the problem of supplying these needs; the composition, digestibility and economic value of the various classes of animal foods. (Laboratory work).

Bee-keeping: Lectures with demonstrations to be taken with Part I of the **Intermediate course** (details given there).

Physics: Nature and origin of soil; soil moisture, heat, and air; principles of cultivation; drainage; identification of samples of soil; farm conveniences.

Field Husbandry: Importance of field crops; system of farming; rotation; fertility of soil; cultivation of the land; seed selection; classes, uses, and varieties of farm crops; seed judging; plant breeding.

Horticulture: Vegetable gardening; flower culture; fruit growing.

Entomology: Laboratory study of types of insects; beneficial and noxious types; collections of insects identified; insecticides.

Bacteriology: Soil bacteria; legume inoculation; plant and animal diseases; infection; disinfection; importance of a knowledge of bacteria in the dairy.

Organization and Methods: Report upon the school garden work of Part I; the Regulations of the Department of Education; laboratory equipment for rural schools; School Fairs; laboratory and class methods; management of home gardens.

Winter Reading Course

For the certificate in Elementary Agriculture and Horticulture, candidates are required to have read three books as follows:

Bailey's *Manual of Gardening*. The Macmillan Co., Toronto.

King's *The Soil*. The Macmillan Co., Toronto.

And one of—

Leake's *The Means and Method of Agricultural Education*. Houghton, Mifflin & Co., Boston.

Foght's *The American Rural School*. The Macmillan Co., Toronto.

A paper on the books selected will be set at the subsequent final examinations

Courses for the Intermediate Certificate in Agriculture

The following are the Courses and the Books of Reference for the Intermediate certificate in Agriculture.

PART

Chemistry: Laboratory exercises on chemistry of soils and fertilizers; formation, composition, and reaction of soils; value of humus, barnyard manures; rotation in relation to chemical changes; composition, nature, and uses of commercial fertilizers.

Warington's *The Chemistry of the Farm*.

Physics: Laboratory or field exercises, with lectures on mechanical principles involved in farm machinery; measurements of fields with chain and calculation of areas and drawings of plans; taking of levels and making plans for drainage; physical analysis of soils, determination of air and water holding capacity of different soils.

King's *The Soil*.

Botany: Practical identification of weeds, weed seed and grasses.

Gray's *Field, Forest and Garden Botany*. O. A. C. Bulletin No. 188, *Weeds of Ontario*.

Floriculture: Methods of cultivating, seeding, transplanting, treating for diseases and insect pests; wintering; propagation of cuttings; flower borders; bulb culture.

Entomology: Lectures, laboratory exercises, and field work in common insects of garden, orchard, fields and woods; special study of life histories of injurious forms and consideration of methods of treatment. Collection required.

Sanderson and Jackson, *Elementary Entomology*. *O. A. C. Bulletins*.

Micro-Biology: Lectures and demonstrations on morphology and physiology of micro-organisms (moulds, yeasts and bacteria); bacteriology of soil, legume cultures; bacteriology of dairy; contamination and care of milk; bacterial diseases of plants; bacteria in relation to household.

Marshall's *Micro-Biology*.

Poultry Husbandry: Lectures and demonstrations on breeds and selection of stock, locating poultry plant, houses, incubators, brooders, feeds, marketing, diseases, ducks and geese, poultry literature. Students will also receive practical instruction in managing incubators.

Robinson's *Principles and Practice of Poultry Culture*. *O. A. C. Bulletin No. 189*.

Bee-keeping: Lectures with demonstrations and practical work; hives, building of bees; handling of bees; life histories of queen, drone, and worker; swarming; gathering and storing of honey in combs; harvesting honey; relation of bees to fruit and seed growing; diseases; races of bees; winter and spring management.

Root's *The A B C and X Y Z of Bee Culture*.

Organization and Methods: Discussion of the Regulations of the Department of Education; directions and suggestions for carrying out the work in the schools.

PART II

Field Husbandry: History of agriculture; different systems of farming different kinds of soil; rotation of crops; farm crops in their relation to drainage; application of manures; green manuring; preparation of the land for the different crops; methods of cleaning, testing, and selecting farm seeds; study of cereals, roots, fodder crops, grasses, clovers, and other farm crops; sowing, harvesting, preserving, marketing.

Warren's *Principles of Agriculture*. *Annual Reports of Field Husbandry Department*, *O. A. C.*

Animal Husbandry: A study of the history and characteristics of the principal breeds of live stock, including light and heavy horses, beef and dairy cattle, sheep and swine; feeding and management; principles of breeding; registration of pedigrees; market requirements; practical work in judging stock.

Plumb's *Types and Breeds of Farm Animals*.

Dairy Husbandry: The herds: formation, care, and management of a dairy herd; rearing of calves: dairy, stables; lighting, cleaning, and ventilating; individual cow records. The milk: care of milk; elementary, chemical and bacteriological study of milk. The home dairy: running of hand separators and care of dairy utensils; manufacture, packing, and marketing of butter.

Dean's *Canadian Dairying*.

Botany: Identification of plant diseases, treatment of diseases, fungicides, collection of weeds, grasses and common fungus diseases.

Gray's *Field, Forest and Garden Botany*. O. A. C. Bulletin No. 188, *Weeds of Ontario*. Massee's *Plant Diseases*.

Fruit Growing.—Treatment of fruit plantations; cultivation, grafting, propagation, spraying, marketing.

Vegetable Growing: Methods of sowing and cultivating, treating for diseases and insect pests; marketing; preparation and care of hot beds and cold frames; production of early vegetables; selection of varieties.

Landscape Gardening: Improvement of school and home grounds; tree planting; care of shrubbery, and trees.

Bailey's *The Principles of Fruit Growing*. Green's *Vegetable Gardening*. Rexford's *Home Floriculture*. Waugh's *Landscape Gardening*.

Farm Management.—Needs of business methods in farming; farm accounting, factors determining cost of production; profitable employment of labour, equipment and capital; the problems of maintaining fertility, adapting methods of farming to changed conditions, carrying on farm work economically.

Warren's *Farm Management*.

Rural Economics: The farmer's relation to society and industry; social advantages and needs of rural life; relation of land, capital, labour, taxation, banks, markets, and transportation facilities to the business of farming. Methods and principles of co-operation in farm work, manufacturing, marketing, and banking.

Carver's *Principles of Rural Economics*. Wolff's *Agricultural Co-operation*.

Organization and Methods: Discussion of the Regulations of the Department of Education; directions and suggestions for carrying out the work in the schools.

Course in Farm Mechanics

The course in Farm Mechanics for 1917 commenced August 6th and continued till August 31st.

The following are the subjects of the course for the certificate in Farm Mechanics, obtainable by teachers who hold or are in course of preparation for an Intermediate certificate in Agriculture; the course will be arranged to cover as far as practicable the topics which have the commonest application to farm work; suitable books of reference are given below:

(1) The use and care of common woodworking tools; making of simple objects required on the farm such as hen coop, trap nest, dog kennel, tool handles, whiffle-trees, double-trees, wagon jack, feed hoppers, cold frame, wheelbarrow, saw bench, ladder, window boxes, split log drag, etc.

COURSES OF STUDY

Lower School

The following is the Lower School Course of Study. Subject to the approval of the Inspector, modifications may be made therein to suit local conditions.

First Year

September

Physics: Measurements of fields and surveys for drainage; needs, value and methods of drainage.

Gardening: Selection, purchase and outdoor planting of bulbs; methods of potting and forcing bulbs for winter bloom.

October

Plant Studies: Field studies of weeds; habits of growth and seed distribution; methods of eradication.

Fruit Growing: Fall management of orchard, pruning and cultivation; methods and systems of fruit packing; work of co-operative fruit associations; law relating to fruit marking, etc.

Bee-keeping: Management of bees in fall and winter.

November

Poultry: Housing, feeding and management of poultry in winter; fattening and marketing; breeds.

Horticulture: Cutting scions from fruit trees to store for root-grafting in winter. Planting apple seeds for production of seedlings.

December

Chemistry: Simple study of plant substances, such as determination of moisture, carbon, ash, starch, and gluten; simple studies of soils, insecticides, fungicides, and common substances used on the farm.

School Meeting: Public meeting at school at which reports on work done will be given and prizes distributed.

January

School Progress Club: Organization and plans for home project work; arrangements for preliminary reading, recording, and supervising work.

Dairying: Milk testing with Babcock tester; care of milk and pasteurization; use of lactometer; individual cow records and herd improvement; care of dairy herd; construction of dairy stables.

February

Botany: Determination of weed seed impurities in clover seed, etc.; germination tests of farm and garden seeds; Seed Control Act; methods of combating weeds.

March

Soil Studies: Simple physical analyses of different classes; comparisons by weight; determination of air and water capacities, capillarity; effects of frost, lime and humus on clay.

Gardening: Preparation, care and uses of hot bed and cold frame; methods of growing potatoes, onions, rhubarb, lettuce, cabbage, tomatoes, etc., for early crops; small fruit culture: methods of growing strawberries, raspberries, currants, grapes, etc.

April

Poultry: Incubation, brooding and rearing of chicks; management of poultry in summer.

Gardening: Beautifying of home surroundings; plans for home gardens; preparation of soil: selection of varieties; planting tables; care of growing plants.

May

Garden Work: Preparation and planting of experimental and demonstration plots in school gardens; work in home gardens.

Bee-keeping: Colony studies to learn organization, life histories and work of bees; construction of hives; methods of handling.

Botany: Study of flowers of fruit trees, the setting and development of fruit; natural and artificial fertilization; flowers and seed-development of forest and shade trees.

June

Insects: Recognition, life histories, work and remedies for insects injurious to orchard and garden; spraying mixtures and application.

Botany: Study of economic plants, such as grasses, ornamental shrubbery, garden flowers.

Crop Improvement: Plans for selecting choicest seed of grains, vegetables or flowers for next year's growing; work of Canadian Seed Growers' Association.

July and August

Supervision of Practical Work: Reports on care and management of school experimental plots and home projects of pupils.

Second Year

September

Gardening: Storing vegetables, fruits and house plants for winter; methods of winter forcing of rhubarb, swiss chard; preparations and seeding for early spring crops.

Bacteriology: Moulds and bacteria in relation to canning and preserving; methods of canning. Work of bacteria in soil; legume bacteria.

October

School Exhibit: Exhibition of pupils' and school's work at school or local fair.

Horticulture: Preparation for winter of tender climbing plants, shrubs and flowers; lifting, dividing and replanting perennials.

Home Projects: Reports on home gardening projects and summarizing results.

November

Farm Animals: Breeds of cows, horses, sheep, and swine; practice in using score cards; telling of age of horses by teeth; care and management of farm animals; construction of stables.

December

Agricultural Arithmetic: Estimating of holding capacities of mows, bins, wagon boxes, silos, cisterns, wells, troughs, barrels, milk utensils; estimates of weights of hay loads, stacks, manure piles; estimate of sand, cement, lime, brick, stone or lumber required in building barns, sheds, silos, etc.

Rural Economics: Laws relating to agriculture; organizations for advancing agriculture; co-operative associations; value of good roads; rural advancement, etc.

January

Dairying: Simple analysis of milk to show albumen, casein and sugar; composition and value of whey and buttermilk; experiments to show effects of bacterial or mould contamination; construction, care and advantages of cream separator; manufacture of butter and cheese; dairy manufacturing; visit to creamery or evaporator.

February

Farm Crops: Kinds of farming and the best kinds for the neighbourhood; crops best suited to locality and best varieties of grains; methods of crop improvement; systems of rotations and values; plans for model farms.

March

Physics: Principles of farm machines or appliances; simple experiments with pulleys, levers, etc.

Chemistry: Uses of manures and fertilizers; examination, identifications and simple tests for common commercial fertilizers; calculation of values and proportions in which to be mixed.

April

Fruit Growing: Selection of location and planting plans for orchards; varieties suited to local planting; orchard management and care; methods of pruning and grafting.

Agriculture: Methods of soil cultivation; best times and methods of seeding. Farm management: care of machinery, costs of manuring, soil preparation, seeding, harvesting, threshing and marketing.

May

Garden Work: Work in home gardens or school plots.

Botany: First year's work continued.

Bee-keeping: First year's work continued.

June

Insects: First year's work continued.

Botany: First year's work continued with study of common plant diseases and treatment for them.

Horticulture: Methods of budding and propagation by cuttings.

July and August

Supervision of Practical Work: Reports on care and management of school experimental plots and home projects of pupils.

Middle School

Agricultural Physics: Soil: classification and physical examination, origin, and mode of formation; soil forming, soil-forming rocks and minerals; behaviour towards moisture. Surveying and drainage: measurement of fields and farms with the chain: calculating areas and drawing plans; use of various instruments for de-

termining levels, preparing plans for drainage; methods of digging, laying of tile, and filling of trench; calculations concerning required size of tile and cost of various systems. Conservation of moisture by drainage, mulching, and cultivation; capillarity and its relations to plant growth. Water capacity of different soils. Mechanics: principles of farm machinery; principles of ventilation, lighting and heating.

Agricultural Chemistry: Chemical composition of soils; elements used by plants; availability and assimilation of plant food in the soil; application of fertilizers; absorption and retention of important constituents, as nitrogen, phosphoric acid, and potash; insecticides and fungicides; their composition and proper mixture.

Botany: Identification and eradication of weeds and weed seeds, seed Control Act and its application; experiments to show seed germination and growth of plants; the relation of plants to soil, air, light, temperature, and moisture; systematic study of the structure of cereals, grasses, legumes, and roots; plant diseases; smut, rust, mildew, etc.; how to recognize and combat them; collecting, pressing, and mounting of weeds and grasses and weed seeds.

Entomology: A practical course in economic insects, identification, habits, and life histories; a close study of the more important insects, by means of breeding and rearing cages; insecticides; collecting of injurious and beneficial insects and samples of their work.

Micro-Biology: Morphology and physiology of micro-organisms, moulds, yeasts and bacteria; bacteriology of soil, legume cultures; bacteriology of dairy; contamination and care of milk; bacterial diseases of plants; bacteria in relation to household.

Poultry Husbandry: The most valued breeds and varieties of hens, ducks, geese, and turkeys, their characteristic points and peculiarities; various methods of housing poultry; incubation, brooding, and rearing of chickens; general methods of feeding and management; market conditions; the fattening and dressing of poultry for home and foreign markets.

Bee-keeping: Management, wintering, swarm control, honey production, increase, queen-rearing, symptoms and treatment of disease.

Second Year

Farm Management: Needs of business methods in farming; farm accounting; factors determining cost of production; profitable employment of labour, equipment and capital; the problems of maintaining fertility, adapting methods of farming to changed conditions, carrying on farm work economically.

Rural Economics: The farmer's relation to society and industry; social advantages and needs of rural life; relation of land, capital, labour, taxation, banks, markets and transportation facilities to the business of farming. Methods and principles of co-operation in farm work, manufacturing, marketing, and banking.

Field Husbandry: History of agriculture; different systems of farming, different kinds of soil; rotation of crops, farm crops in their relation to drainage; application of manures; green manuring; preparation of the land for the different crops; methods of cleaning, testing, and selecting farm seeds; study of cereals, roots, fodder crops, grasses, clovers and other farm crops; sowing, harvesting, preserving, marketing.

Animal Husbandry: A study of the history and characteristics of the principal breeds of live stock including light and heavy horses, beef and dairy cattle, sheep and swine; feeding and management; principles of breeding; registration of pedigrees; market requirements.

Visits to local farms, and practical work in judging stock.

Dairy Husbandry: The herds: formation, care, and management of a dairy herd, rearing of calves; dairy stables; lighting, cleaning, and ventilating; individual cow records. The milk: care of milk, elementary chemical and bacteriological study of milk. The home dairy: running of hand separators and care of dairy utensils; manufacture, packing, and marketing of butter.

Visits to local creameries and cheese factories, and a study of factory methods of manufacture, packing and marketing.

Horticulture: Fruitgrowing: Treatment of fruit plantations; cultivation, grafting, propagation, spraying, marketing. Vegetable Growing: Methods of sowing and cultivating, treating for diseases or insect pests, marketing; preparation and care of hot beds and cold frames; production of early vegetables; selection of varieties. Floriculture: Methods of cultivating, seeding, transplanting, treating for diseases or insect pests, wintering; propagation of cuttings; flower borders; bulb culture. Landscape Gardening: Improvement of school and home grounds; tree planting; care of shrubbery.

Forestry: Forestry as related to the farm; classification of the common forest trees, the establishment, care and protection of the wood-lot; varieties and methods for roadside planting and shelter belts.

Senior Public School Graduation Examination, June, 1917

(Lower School, Part I. Entrance to Normal Schools)

AGRICULTURE AND HORTICULTURE

NOTE.—*The candidate will take six questions, of which one must be number 7.*

1. (a) Name two of the commoner weed-seeds which might be looked for as impurities in alfalfa or red clover, and two which might be looked for in oats or wheat.

(b) Describe each of these four weed-seeds in regard to size, shape, colour, and surface markings.

(c) Describe each of the four weeds which produce the seeds you have named above.

2. Describe the method employed in the domestic canning of (a) tomatoes or beans, (b) peaches or strawberries; making diagrams of the apparatus used.

3. (a) Compare the following breeds of horses as to size, colour, action, and origin: Percheron, Clyde, Standard Bred.

(b) Point out the chief differences between the teeth of a male four-year-old horse and the teeth of a male eight-year-old (molars not to be considered). Give diagrams.

4. (a) Show how to prove by simple experiments that ordinary milk contains water, carbon, ash, casein, albumen.

(b) Describe the lactometer test.

(c) A sample of milk gives a low lactometer reading and a low percentage of butter fat. What do these facts indicate?

5. (a) In orchard management, specify the chief uses of pruning, mulching, cover crops, cultivation.

(b) Describe, with diagram of the top layer, two methods of packing apples in boxes.

(c) A box, 21 inches long and 12 inches wide, is to be packed with apples 3 inches in diameter. The apples may be assumed to be spherical. Show, by a drawing to scale, the actual appearance of one layer of apples lying on the bottom, according to each of the two methods of packing.

6. (a) Describe a successful method of treatment employed to combat *either* San José scale *or* the oyster shell scale.

(b) Tell how to prepare Bordeaux mixture.

(c) In spraying for codling moth, state the kind of spray to be used and when it should be applied.

7. A cow gave 14 quarts of milk at each milking (twice a day) for the month of June. The milk tested 3.2 per cent. of butter fat on an average, and butter is composed of 80 per cent. of butter fat. Find the value of the butter at 35c. per pound, assuming that the specific gravity of milk is 1.035 and that a gallon of water weighs 10 pounds.

Middle School Examination for Entrance into the Normal Schools, June, 1917

AGRICULTURE AND HORTICULTURE

First Paper

NOTE.—*Six questions only to be answered, of which No. 6 must be one.*

1. Point out the relation to soil fertility of (a) micro-organisms, (b) humus, (c) lime-stone.

2. Give the chief characteristics of any *two* of the following breeds: (a) S. C. Brown Leghorn, (b) R. C. Rhode Island Reds, (c) White Wyandottes.

3. Describe the management of bees, under the following heads: (a) wintering, (b) foul brood, (c) swarming, (d) supers.

4. (a) Describe the method of preparation and the special use of (i) Bordeaux mixture, (ii) lime-sulphur.

(b) Name the particular pests that each is supposed to control.

5. Using drawings, outline the life history of any *two* of the following: (a) oat smut, (b) grape mildew, (c) peach leaf-curl.

6. (a) What is the maximum amount of water that would be delivered through a 3-inch tile in one week, if the water runs at the average rate of 10 linear feet per minute?

(b) Point out four beneficial results that may be derived from tile-drainage.

7. (a) Show how moisture may be conserved for the use of a potato crop.

(b) Describe (for potatoes) the "hilling" and the "flat" methods of cultivation, pointing out the advantages and the disadvantages of each.

8. Give an account of your home project, under the following heads:—

(a) Purpose of the project.

(b) Practical work required.

(c) Assistance received from the teacher and others.

(d) Results obtained.

Middle School Examination for Entrance into the Normal Schools, June, 1917

AGRICULTURE AND HORTICULTURE

Second Paper

1. Compare in detail:—

- (a) The Percheron and Clydesdale breeds of horses.
- (b) The Jersey and Galloway breeds of cattle.
- (c) The Holstein and Polled Durham breeds of cattle.

2. (a) State the characteristics of any *three* of the following breeds of sheep: Shropshire, Southdown, Leicester, Merino.

(b) Compare the wool of the Southdown with that of the Leicester with respect to (i) amount produced at one shearing, (ii) fineness, (iii) value per pound.

3. Describe a method of proving that milk contains each of the following: albumen, casein, water, sugar.

4. (a) Make a diagram, properly labelled, of a 100-acre farm conveniently laid out for mixed farming.

(b) Make a list of stock and implements essential for the efficient management of such a farm.

5. (a) Make diagrams to show the structure of a hot-bed and a cold-frame.

(b) State the chief uses of each.

(c) Specify the precautions to be taken in the management of a hot-bed.

6. Give three special uses of each of any *four* of the following trees: white oak, black walnut, white cedar, shell bark hickory, white ash, white pine, sugar maple, basswood, spruce, American elm.

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